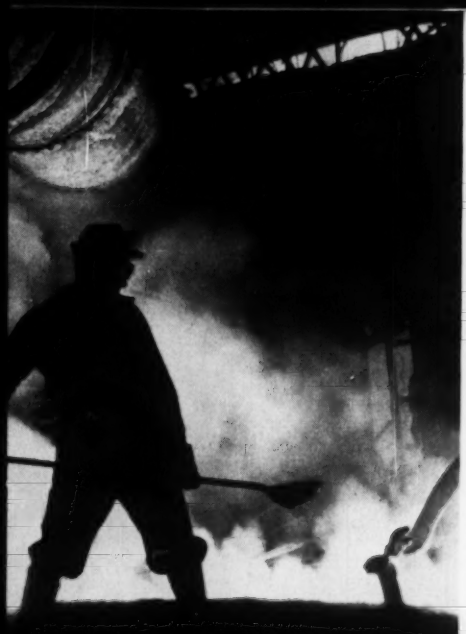
APRIL 20, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



PRODUCTIVITY

Steel Firms, Union Fight Over How to Define and Measure It

One of the most variously interpreted of economic concepts, productivity will be a key issue in coming steel wage talks. Its definition (or lack of agreement on one) could determine the course of negotiations.....Page 47

METALWORKING OUTLOOK . . . PAGE 39

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Aluminum Forgings to Rebound As Costs Dip, Get Competitive

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You Can Fight Plant Fire, Theft

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Three Metals Vie for Auto Trim

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How to Pick the Right Material

Page 92 . . .

Dravo Gets American Rights to Swedish Oxygen Steel Process

Page 100 . . .

Optical Gages Insure Accuracy

Page 119 . . .

Nodular Pipe to Skyrocket 500%

LIGHT GAUGES

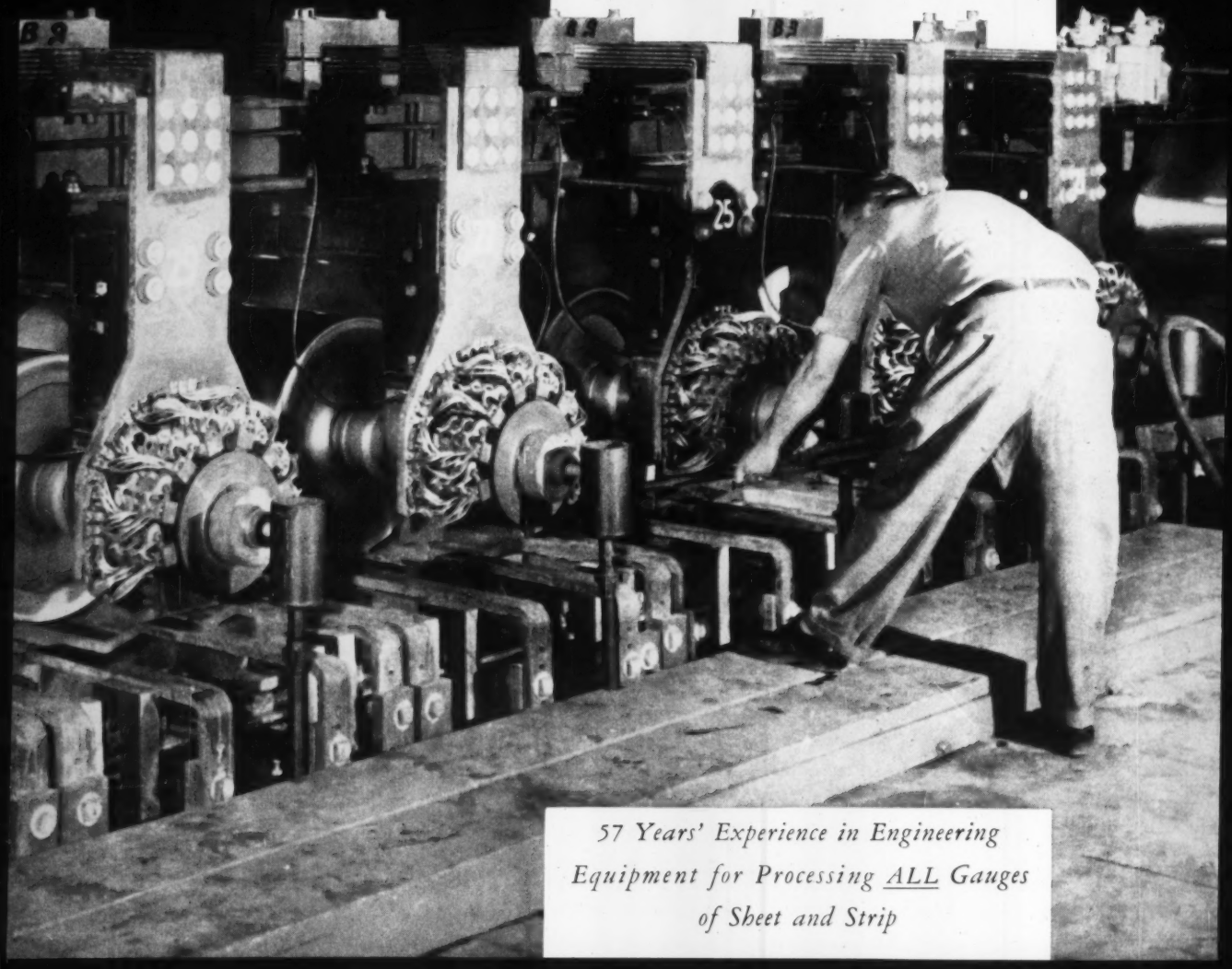
at High Speeds Need Rugged Equipment

Higher and higher speeds and lighter and lighter gauges in tin plate put a greater and greater demand on equipment. High-speed Continuous Processing Lines must be more rugged than ever before to stand up to 21-turn operation. Our experience with processing lines dates back to the earliest production of strip in coils. In those years and today, ruggedness of equipment has been a trademark of Aetna-Standard.

AETNA·STANDARD

A Division of BLAW-KNOX COMPANY

FRICK BUILDING · PITTSBURGH, PA.
ELLWOOD CITY, PA., WARREN AND AKRON, O.



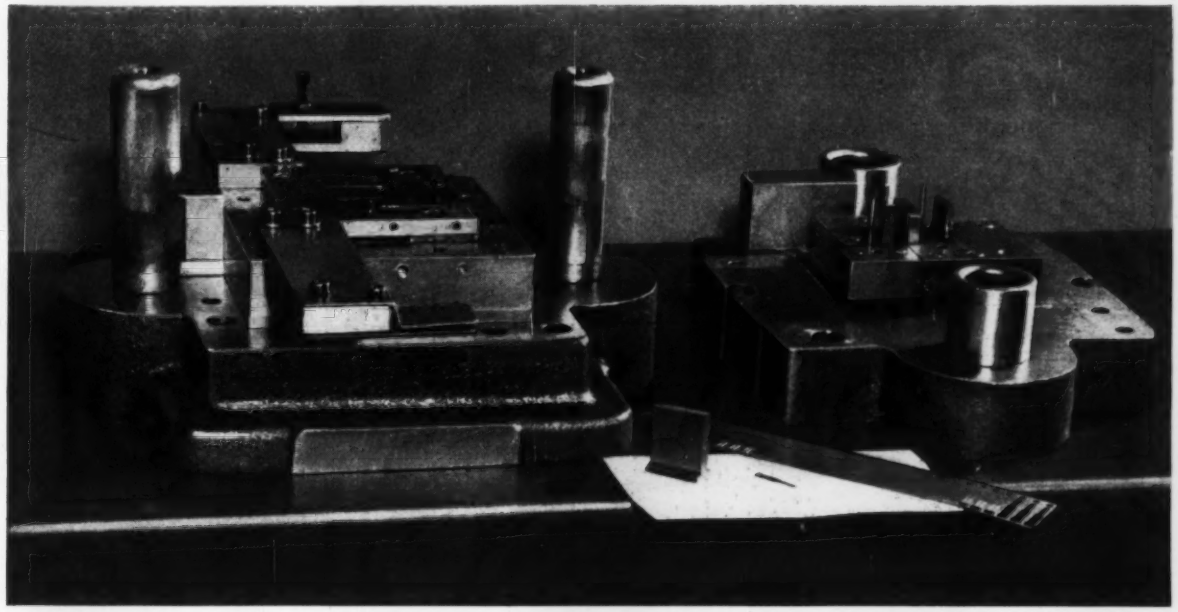
57 Years' Experience in Engineering Equipment for Processing ALL Gauges of Sheet and Strip

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

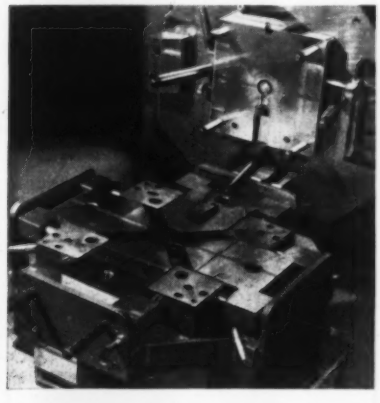
Export Distributor: Bethlehem Steel Export Corporation



Blanking Die Output Doubles When Bearcat Takes Over

At the Remington Rand Division of Sperry Rand Corp. they were getting up to 50,000 pieces from a set of dies that blanks and forms grooved pins from .025-in. steel strip. Our local tool steel distributor, Leed Steel Co., suggested a change to our Bearcat tool steel. Result? The output increased to about 100,000 before the die needed reworking.

Bearcat has exceptional resistance to wear and shock. Because of its air-hardening characteristic, Bearcat minimizes quenching hazards and distortion in heat-treatment.



WIDE RANGE OF APPLICATIONS

In addition to blanking and forming jobs, Bearcat can be used economically in such varied applications as shear blades, punches, rivet sets, hot headers, die-casting die inserts, and master hobs. In fact, wherever the job calls for a grade having unusual toughness, Bearcat is the answer.

Your Bethlehem tool steel distributor carries Bearcat in stock in a wide size range. He's ready to serve you at a moment's notice. Give him a call today.

←Memo to Die-Casters:

USE CROMO-HIGH V (H-13)

You can't go wrong when you choose Bethlehem Cromo-High V (AISI-SAE H-13) for die-casting. This 5 pct chromemoly grade, with 1 pct vanadium, has good resistance to wash and erosion, plus plenty of toughness. It's uniformly annealed, for easy machinability. It also has good center density and grain refinement, and is free from porosity.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

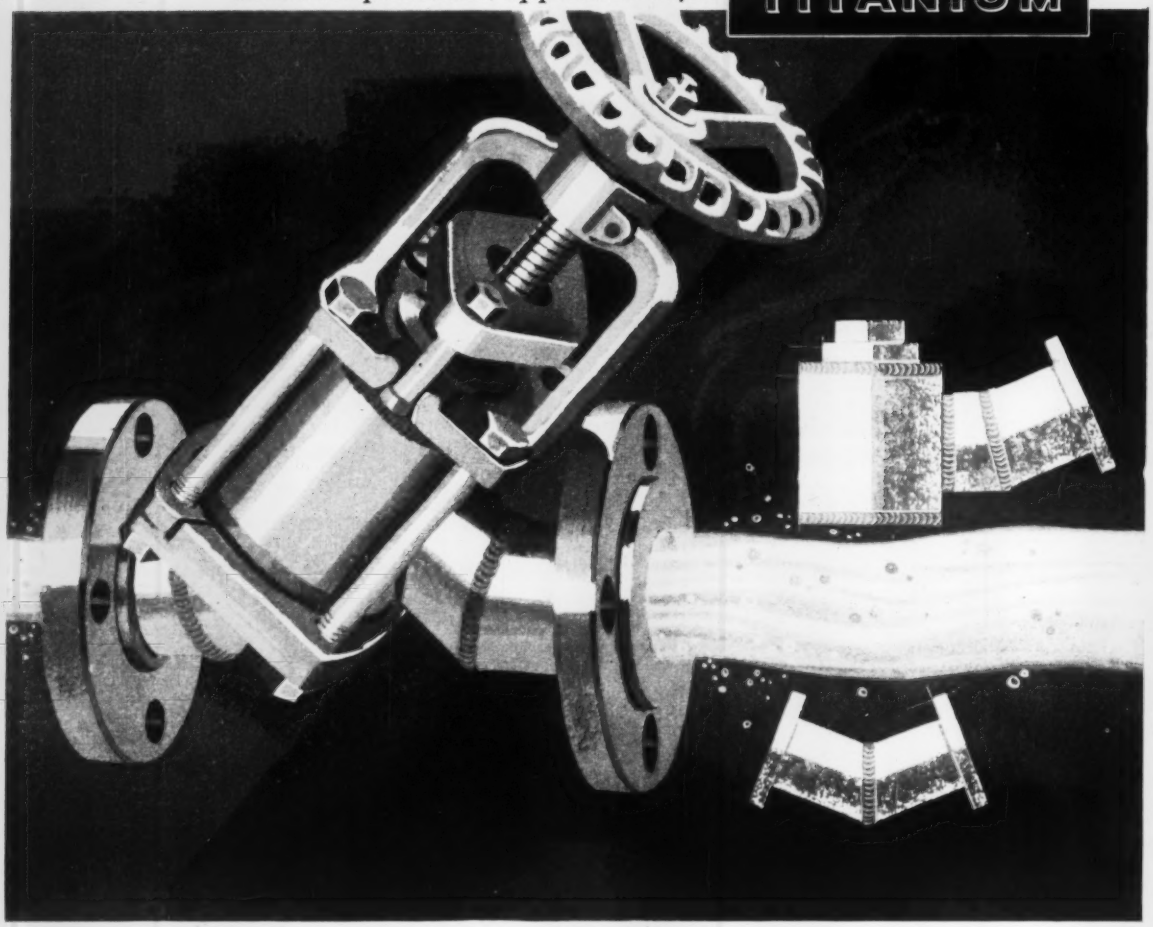
Periodic Regrinding Improves Tool Life

The service life of many types of tools can be improved if the tools are periodically reground at intervals before they have deteriorated to a degree which impairs their function.

This practice is particularly useful when applied to tools which repeatedly fail in service by fatigue, chipping, spalling, or cracking through heat checks. The objective of preventative grinding is the removal of service-damaged metal before the damage progresses to a depth which would not be removed in normal redressing operations. It is an application of the old proverb, "A stitch in time saves nine," and is just as appropriate when applied to tools as to a small rip in a piece of wearing apparel.

The point at which regrinding should be done during the service of a given tool must be developed by experimental work. It is most practical if it can be made to coincide with a normal shutdown of an operation for other reasons.

Another practical application for **TITANIUM**



"CORROSION SPECIALISTS" TURN TO TITANIUM

...for working parts of new DURCO® valves

The Duriron Company, Inc., manufacturer of "Durco" valves and pumps, specializes in design and manufacture of equipment for corrosive service. Now they're among the first to turn to titanium . . . producing, to order, fabricated valves used in highly corrosive applications. These valves are specially designed for handling hot nitric acid, hot chlorides, organic acids, mixed acids, etc.

In the Durco Type K "Y" valve, shown above, *all metal parts in contact with corrosive solutions are Mallory-Sharon titanium.* Mallory-Sharon engineers worked closely with Duriron designers on welding and forming techniques for the new valves. Mallory-Sharon titanium mill products are also being used in a Durco plug valve and a new line of corrosion resistant "Durcopumps".

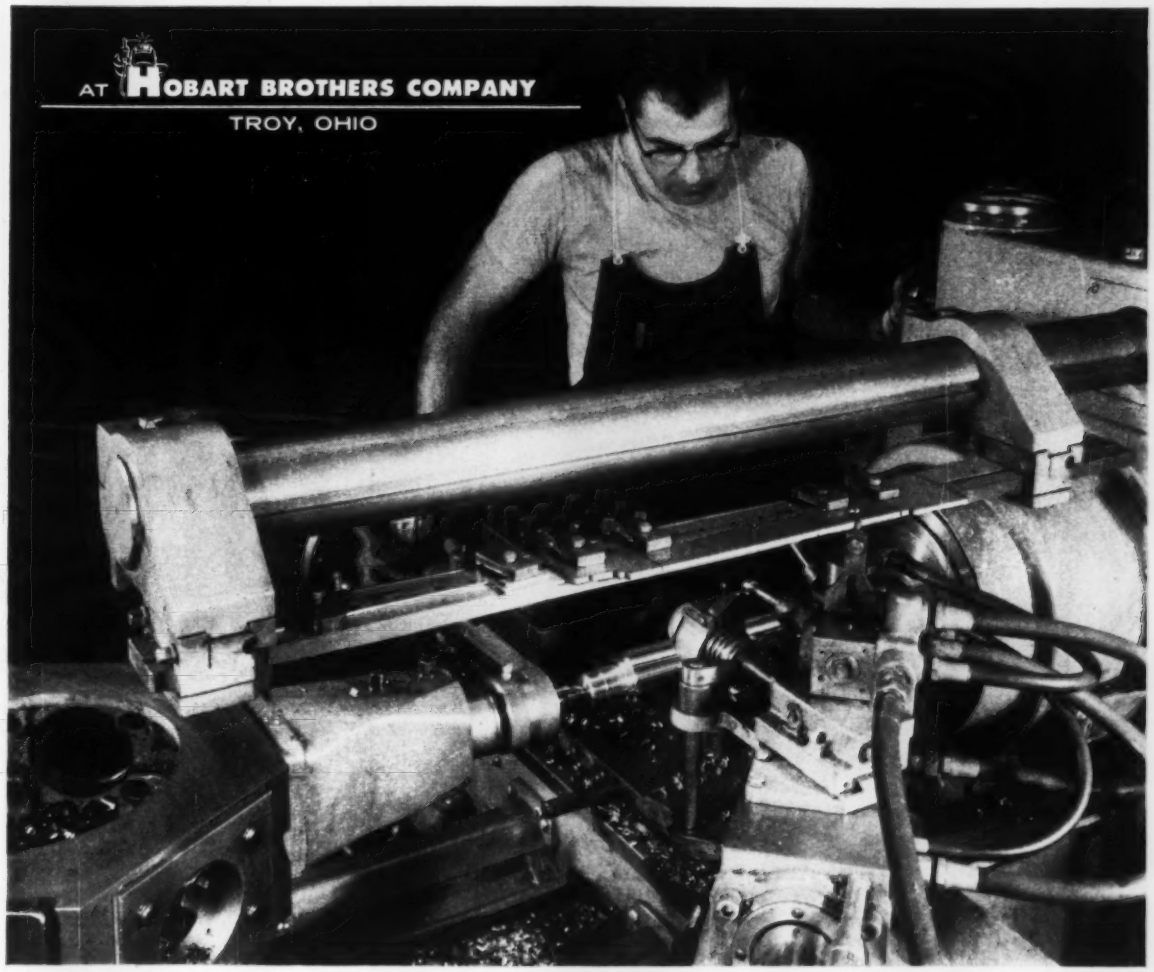
For help in applying titanium's unusual corrosion resistant properties to *your* processing equipment, write for Technical Data Sheet on *Titanium Valves for Chemical Service.* Please address: Commercial Market Development, Department B, Mallory-Sharon Metals Corporation, Niles, Ohio.

MALLORY SHARON

MALLORY-SHARON METALS CORPORATION · NILES, OHIO

Integrated producer of Titanium · Zirconium · Special Metals

1959 DESIGN ENGINEERING SHOW
PHILADELPHIA · MAY 25-29



Warner & Swasey 2-A with contouring cross slide

Slashes setup time—from 2 hours to 20 minutes • Combines auxiliary operations into one setup • Produces shafts at 1948 cost levels

Hobart Brothers Co. faced a serious production bottleneck. Long setup time on their older turret lathes and excessive part handling time was crippling the small lot production of motor-generator shafts. Because their production scheduling for 77 different models of arc welders, 20 models of ground-power units, plus numerous specials, is tied directly to sales, lot sizes frequently had to remain small—usually from 1 to 20 pieces.

Hobart launched a three-pronged attack to solve the problem by:

1. Installation of a new Warner & Swasey 2-A Saddle Type Turret Lathe equipped with a hydraulically-controlled cross slide contour unit.
2. A creative tooling approach to reduce setup time.
3. A thorough time and motion study to insure efficient utilization of daily production time.

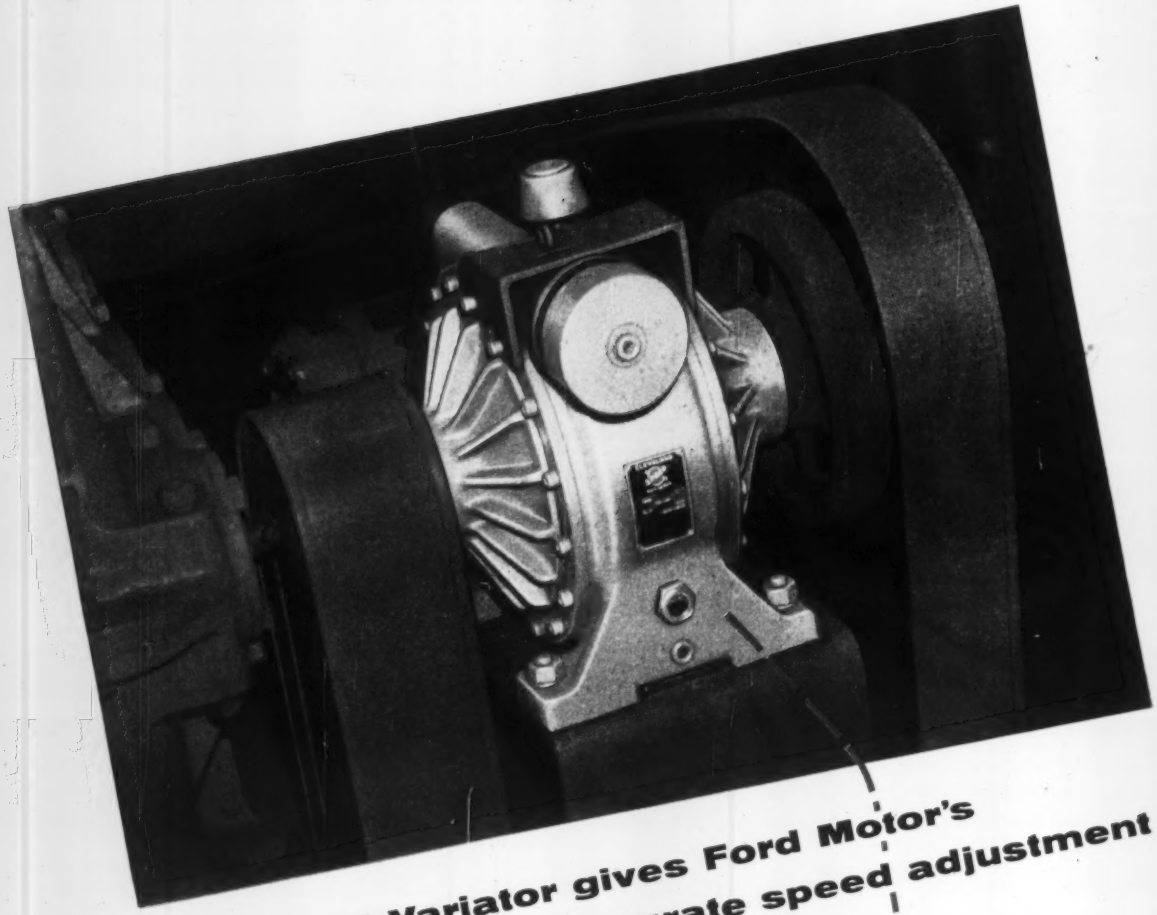
As a result, Hobart Brothers today are producing shafts at 1948 production costs!

Contributing to the success of this efficiency study and modernization program was their new contour cross slide equipped Warner & Swasey 2-A which also permitted:

- **Combining of center drilling, facing and threading operations into a single, efficient turret lathe setup reducing part handling time.**
- **Production time savings averaging 35% because of higher horsepower and spindle speeds, and elimination of extra hex turret and square turret handling time.**
- **Holding closer tolerances which reduced grinding time and extended grinding wheel life.**

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY



Cleveland Speed Variator gives Ford Motor's mold reel conveyor fast, accurate speed adjustment

Positive, infinitely variable speed control is a must on the mold reel conveyor drive installed at Ford Motor Company's Specialty Foundry, Dearborn, Michigan. Efficiently handling the job is this 6K6 Cleveland Speed Variator designed into the conveyor's drive by the builder, C. O. Bartlett & Snow Co.

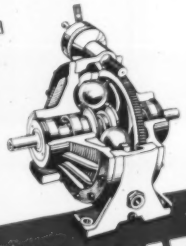
To lock the Variator setting at any desired conveyor speed, Ford engineers designed a saddle and hasp arrangement which is part of the over-all drive setup.

Ford Motor's Variator provides a continuous speed progression on a full 9:1 range—to meet any variation in conveyor line operations.

Learn today what these rugged Cleveland Speed Variators can do to help improve your particular manufacturing processes. Write for the "Cleveland Variator Story"—it's all contained in our free, illustrated Bulletin K-200.

The Cleveland Worm & Gear Company, Speed Variator Division, 3270 East 80th St., Cleveland 4, Ohio.

Subsidiary of Eaton Manufacturing Company



HOW IT WORKS

Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts. Relative speeds of the shafts are adjusted by changing the positioning of the axles on which the balls rotate (see cutaway view, right).

CLEVELAND SPEED VARIATOR

This Week in STEEL The Metalworking Weekly

April 20, 1959
Vol. 144 No. 16

EDITORIAL 45

Odds are 99 to 1 that steelworkers will strike. It could run to Labor Day—that's nine weeks.

SPECIAL FEATURE 47

PRODUCTIVITY

You've seen and heard this word a lot, but you'll have it tossed at you a great deal more when steel wage talks get underway. Agreement, or failure to agree, on a definition may determine the course of negotiations.

WINDOWS OF WASHINGTON 56

There's reason to think Senate Small Business Committee recommendations will influence more than small firms' tax problems.

MIRRORS OF MOTORDOM 65

Automakers find that aluminum won't do everything. They're returning to stainless steel for many trim parts.

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Appliance makers have raised their sights for 1959 as the result of better than expected first quarter sales.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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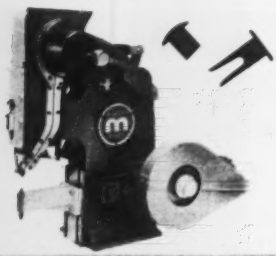
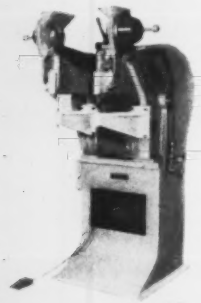
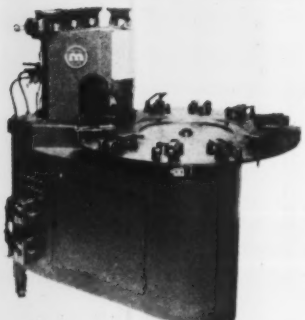


CUT RIVET ASSEMBLY COSTS



with Milford's Complete Line of AUTOMATIC RIVETERS



Can be adapted to solve nearly every fastening and assembly problem. For the answers to assembly problems... *get in touch with Milford first!*

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

behind the scenes

Difficult Measuring Job

"Now, this here business of measuring productivity in steel," said the fat man at the oyster bar, reaching for his 24th bivalve mollusk. "It ain't as easy as it looks, you know. You just don't take men and hours and tons and dollars, and divide them into each other. You have to consider factory resale, maintenance, insurance."

"Say, I heard a funny story about an insurance man," interrupted the fat man's companion at the bar. "What I mean is, this guy—"

". . . shifting overhead, taxes, profit margins," continued the fat man, heedless of his friend's conversational incursion. "Why, you could take 40, first class cost accountants, and a squad of government tax experts, two tables of steel production management men, and a delegation of union attorneys, and do you know what?"

Fortunately, the second man wanted to know what, or this report might have come to an end precisely at this point. Fortunately, also, the fat man answered himself.

"Not one of 'em would have come up with an acceptable figure! Management, and unions, and tax experts can measure production with plenty of authority and savvy, and all their figures make sense—except to each other!"

As we take leave of the gentlemen at the oyster bar, abandoning them to their bivalves and heavy conjectures, we open our copy of STEEL to Page 47, and darned if there isn't a story about measuring productivity in steel! It sets forth the problems and difficulties that beset one who would measure steel productivity. This measurement is important because it is one of the key issues in the coming wage talks, and STEEL would be remiss if it failed to keep you informed.

Iron Pipe with Bends

Speaking about useful information, have you been briefed on ductile iron pipe? Ductile iron pipe is a product that will be making production gains in coming years, and if you would like to know more about it, turn to Page 119 in the Market Section.

Ductile iron pipe appeared commercially about a dozen years ago, in England, a far country where the inhabitants drink warm beer and say "cheers" when they mean "down the hatch." Ductile iron pipe can be bent, like steel, but it has greater resistance to corrosion. New applications are being found for it every day. The International Nickel people, who helped develop ductile iron in America (using magnesium instead of cerium) are pleasantly excited, and so is everybody concerned.

Keyhole Journalist Spots Rep

If you approached Harry S. Truman with the glorious news that a Republican had won an Arthur Murray dancing contest, there is a suspicion that he might not be particularly interested. Indeed, when big news is taken to the wrong man, it sometimes falls flat. It is not the fault of the news, understand: It is the fault of the man. Like when Associate Editor Ross Whitehead squeezed into our coop and breathlessly informed us that William J. D'Alexander, STEEL's personable Chicago representative, had been personally noted by Walter Winchell. "Bill squired some actress somewhere, and Winchell referred to him as a business mag editor," said Ross. "It ran in all the papers."

Close questioning revealed that Ross didn't know the name of the actress, the place where the couple was seen, how the famous snooper got wind of the event, or when the item appeared. By the time we get an explanatory note from Bill, the affair will be old hat—and, well, Ross, how were you to know that Mr. Truman and ol' Shrdlu share similar disinterests, particularly in earth-shaking news?

For Winchell's information, D'Alexander is not a business mag ed; he is a business mag rep.

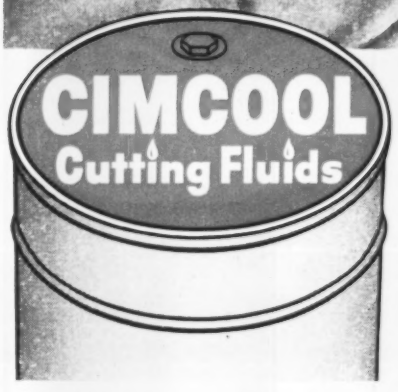
Jukes's Kinfolks, Maybe

We don't know the answer to this one; maybe you can have some fun straightening it out. A mother and a daughter fell in love with and married a father and son; that is, the mother married the son, and the father married the daughter. In the course of biological time, the mother, daughter-in-law of her daughter, and the daughter, mother-in-law of her mother, had four children each, two boys and two girls. They had a cousin, Jennifer, a sort of a slow-witted girl with buck teeth, but she doesn't figure in this deal, at all. As a matter of fact, we're going to take Jennifer out for some ice cream, while you disentangle and name the relationship of the rest of the family.

Shrdlu

(Metalworking Outlook—Page 39)

"Three times better!"
"Latest Cimcool Success Story!
Nation's best-selling chemical
cutting fluid scores again!"
SALES REPORT
2.
and this company had been
using a good grade soluble oil
at 1:20 for machining steel.
But rancidity was making them
change the coolant every week.
So they put in Cimcool at a
1:40 dilution. That was three weeks ago.
And still not a sign of rancidity!
CIMCOOL has saved them money,
and kept production going.
Their grinding room foreman also wants
Cimcool because it has already
increased cutting fluid life three times!
Bud Hume
Detroit Office
* Name of this construction machinery manufacturer on request



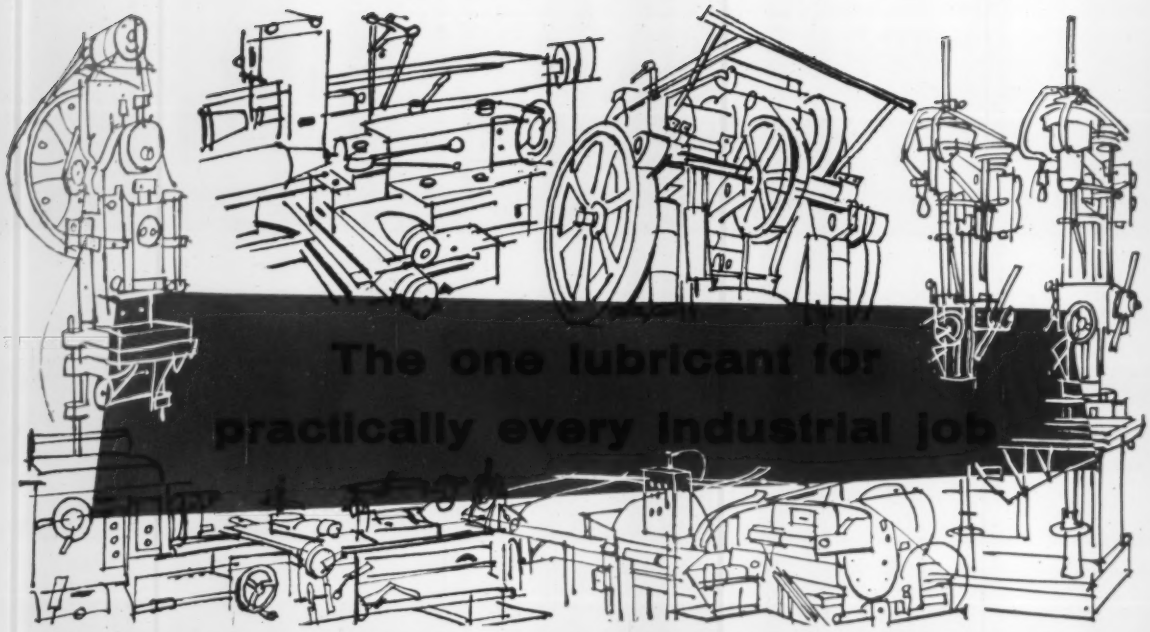
FOR 100% OF ALL METAL CUTTING JOBS

Production-proved products of The Cincinnati Milling Machine Co.

CIMPERIAL—*newest* in the famous, industry-proven line of CIMCOOL° Cutting Fluids!
CIMCOOL 52 Concentrate—The pink fluid which covers 85% of all metal cutting jobs.
CIMPLUS—The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS)—For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

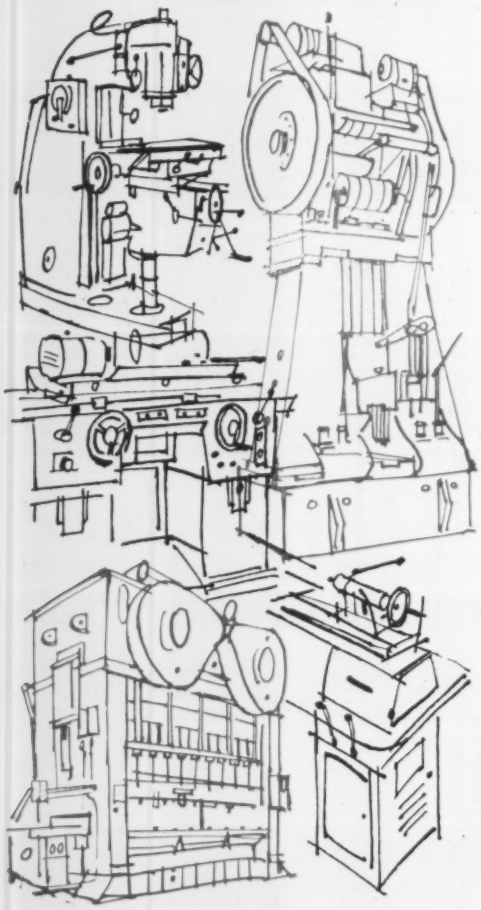
For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, O.

°Trade Mark Reg. U.S.Pat. Off.



ATLANTIC LUBRICANT 54

Performs on all types of grease-lubricated machinery • Cuts cost • Reduces lubricating errors



Atlantic Lubricant 54—an outstanding multi-purpose lubricant —assures:

- **Wider application**—almost universal application to grease-lubricated equipment in plants of all sizes
- **Excellent performance** at very high to extremely low operating temperatures
- **Reduced losses** from lubricating error
- **Lower costs** of warehousing and handling
- **Outstanding rust protection** for all ferrous surfaces
- **Unusual stability** against oxidation and softening—even under very rugged conditions
- **Easy, positive identification**—thanks to Atlantic Lubricant 54's distinctive purple color

Available from conveniently located warehouses. Call any of the Atlantic offices listed below.

ATLANTIC

LUBRICANTS • WAXES
PROCESS PRODUCTS

PHILADELPHIA, PA.
260 So. Broad St.

PITTSBURGH, PA.
Chamber of Commerce Building

PROVIDENCE, R.I.
430 Hospital Trust Building

SYRACUSE, N.Y.
Salina and Genesee Streets

READING, PA.
First and Penn Avenues

CHARLOTTE, N.C.
1112 South Boulevard

In South America
Atlantic Refining Company of Brazil, Rio de Janeiro

Youngstown tin plate

will help feed the families of her day

Automized, round-the-clock canning of foodstuffs in *her* day will feed more families than the world has ever known. Youngstown, today, is anticipating tomorrow's need for tin plate —in increasing quantity and quality. Continuing advancements in facilities, the result of tin plate research, make certain that millions of families in *her* day will enjoy the finest of food... *packaged in Youngstown tin plate.*

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel
Youngstown, Ohio

HOT SPOT in *your* plant?

Chances are 1 in 3 that your plant will have an electrical fire this year. Here's how to guard against it.

In a recent nationwide industrial survey, 29% of the reporting plants had one or more electrical fires during the past two years. Best protection against larger electrical fires? Install a fully-automatic Kidde carbon dioxide fire extinguishing system.

Finest fire protection on the market today, Kidde systems give you 24-hour-a-day protection, act quickly, dependably at the first sign of fire. Kidde systems are pressure-operated, self-contained – need no outside power. Visual indicators show if system is "set" or "released." All parts can be tested without discharging system. No parts to replace after operation or test. All operating parts completely enclosed for safety. Fast, clean carbon dioxide snuffs fire in seconds, then vanishes. Leaves no mess to clean up later, can't harm electrical gear. For more information, write for Kidde's Pressurized Systems booklet today.

Kidde (K Kidde) **Walter Kidde & Company, Inc.**
460 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd., Montreal—Toronto—Vancouver

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LETTERS
TO THE EDITORS

Studies Depreciation Series

I have been interested in the current series of articles in your magazine on depreciation. Unfortunately, STEEL does not stay in my office but is passed on. I would certainly appreciate receiving reprints of "What Depreciation Reform Does American Industry Want?" (Mar. 2, p. 69), "Depreciation Reform: MAPI Plan?" (Mar. 23, p. 72), and "Depreciation Reform: Reinvestment?" (Mar. 30, p. 54).

I would like to keep the complete series for further study and information.

Albert E. Seep
President
Mine & Smelter Supply Co.
Denver

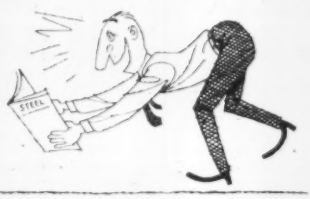
Excellent Presentation

You are to be complimented on your excellent presentation of the article, "Flexible Heat Treat Line Keeps Jobbing Economical" (Mar. 23, p. 122).

We would like to have 12 copies for distribution to our men.

J. Quinten Kenny
Publicity Manager
Surface Combustion Corp.
Toledo, Ohio

Receives Pleasure from STEEL



Please send an extra copy of "Air Weapon Systems Gulp Metals: Here's the First List" (Mar. 23, p. 82). If additional information appears on this subject, I would like to receive an extra copy of each article.

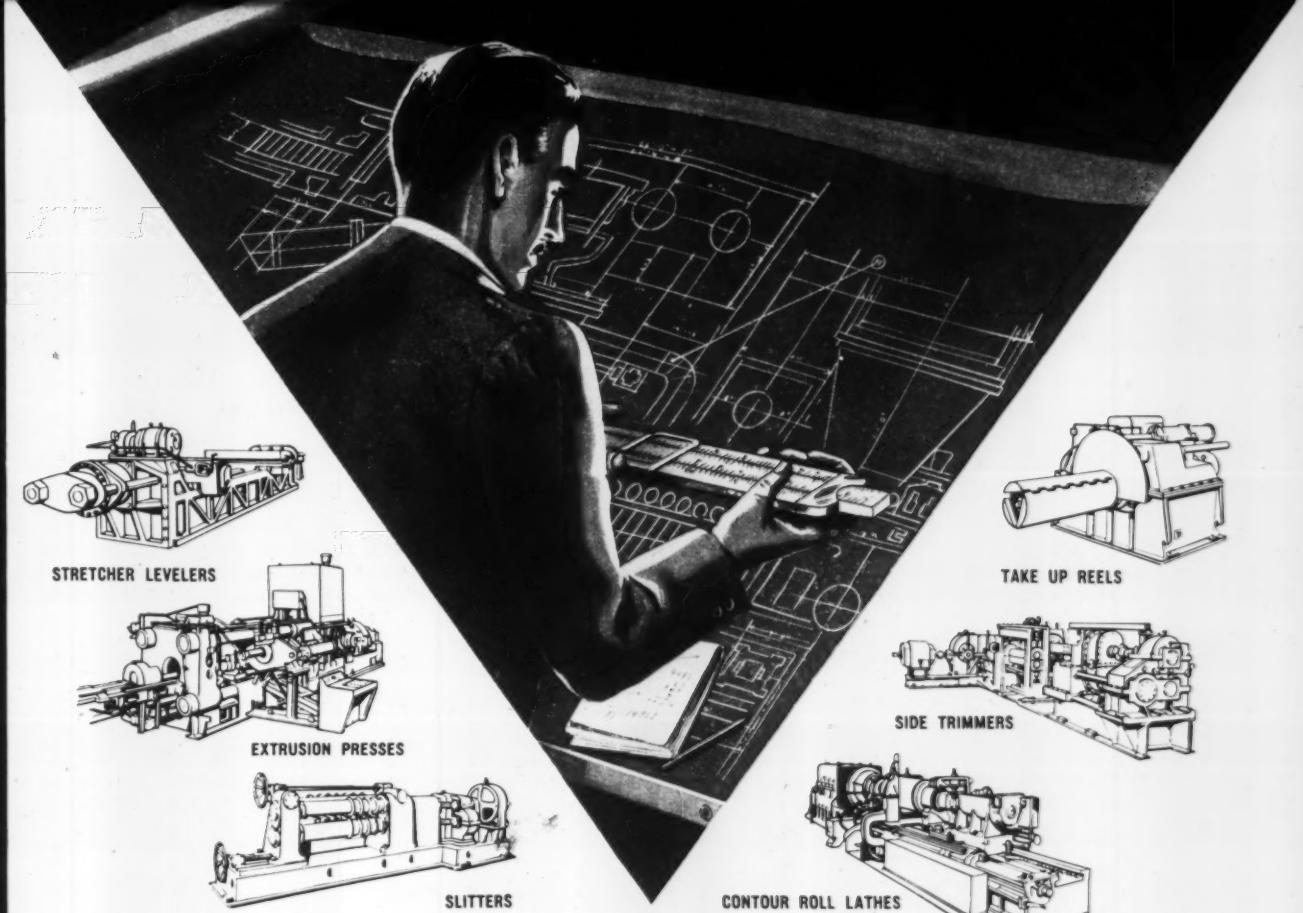
Your magazine is full of excellent material, and it is a pleasure to receive it.

V. Dolson
Acting Manager of Reliability
Convair Div.
General Dynamics Corp.
Ft. Worth, Tex.

Seeks Proper Identification

In "Tape Guided Target Drills Reduce Complex Part Cost" (Mar. 23, p. 128), the author refers to Target drilling without any identification of the tools used. Target is a proprietary name copyrighted

(Please turn to Page 12)



"YOUNGSTOWN" puts new emphasis on DESIGN

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LETTERS

(Concluded from Page 10)

by us for identifying gun drills made under Patent No. 2,418,021. We would appreciate proper identification in future articles.

C. J. Oxford

Vice President-Engineering
National Twist Drill & Tool Co.
Rochester, Mich.

Requests Current Editions

Early in 1958, we received a copy of Facts and Figures of the Metalworking Industry (10th annual edition) and also a copy of Financial Analysis of the Steel Industry for 1957 (33rd annual edition). These two publications were greatly beneficial to us.

Will you advise if such material is available covering the year 1958?

C. J. Wiedow

Division Industrial Relations
Rheem Mfg. Co.
Chicago

• *The 11th edition of "Facts & Figures of the Metalworking Industry" was published Jan. 5 and "Financial Analysis of the Steel Industry for 1958" was published Mar. 30. Extra copies of these articles are available until supply is exhausted.*

Seeks Information on Adhesives

We would like to have information on the physical characteristics of the adhesive, Eastman 910, mentioned in the article "Adhesive Speeds Bonding of Strain Gages" (Feb. 23, p. 96).

William D. Gram

Ross Equipment Co.
Springfield, Ohio

• *We suggest you write the manufacturer, Eastman Chemical Products Inc., 260 Madison Ave., New York 16, N. Y.*

This Firm Uses Machine, Too

"Paint Lasts Longer on Blast Cleaned Structurals" (Feb. 23, p. 88) was most interesting. We utilize a Rotoblast machine for shotblasting our steel grid floors. May we have additional copies of this article?

Robert E. Ward

Sales Engineer
Reliance Steel Products Co.
McKeesport, Pa.

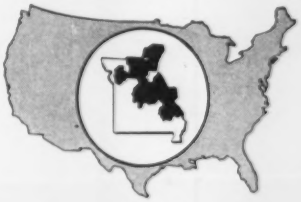
Wants Series for Friend

Thank you for bringing my "Management Series" file up to date. While discussing general business conditions with an associate of mine, I showed him this file. Needless to say, he, too, would like to have the 1959 series!

Daniel G. Schmidt

Accountant
Vulcan Mfg. Co. Inc.
Winona, Minn.

Union Electric Service Area . . . strategic center of America for INDUSTRIAL WATER



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contact: *J. E. Johanson, Manager, Industrial Development,*
UNION ELECTRIC CO., St. Louis 1, Mo.

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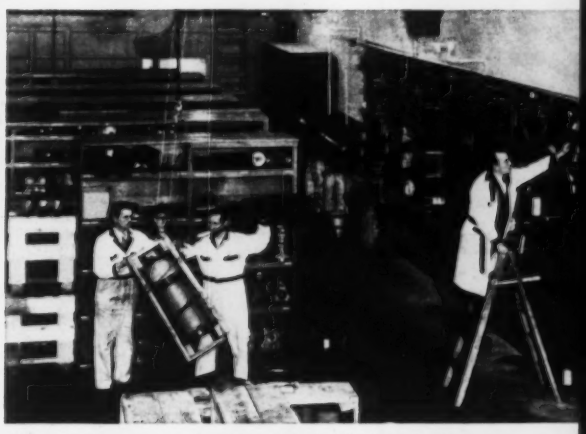

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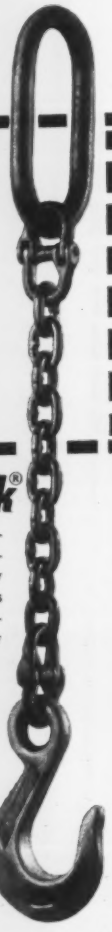

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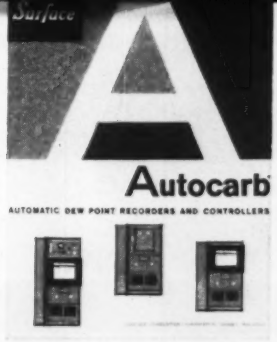

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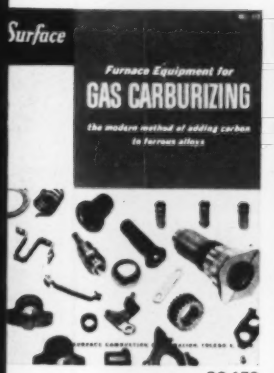

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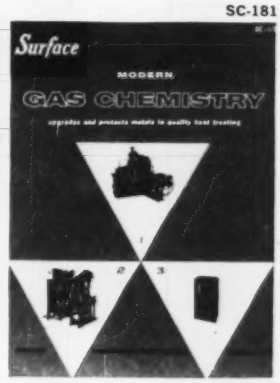

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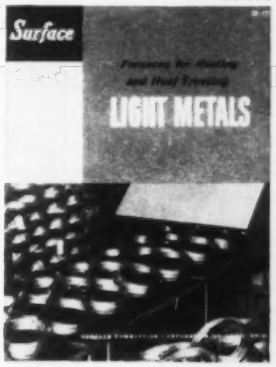

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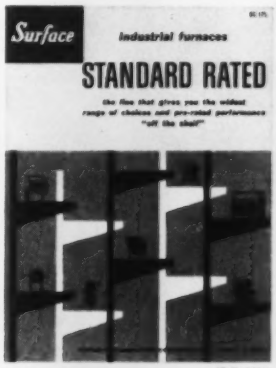

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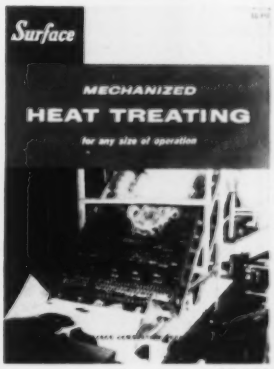

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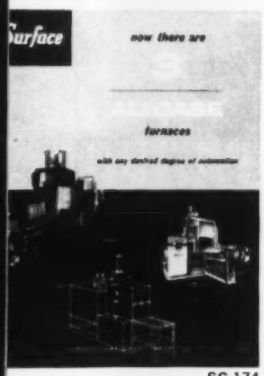

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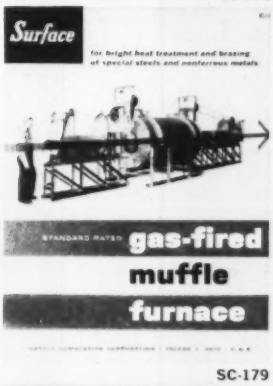

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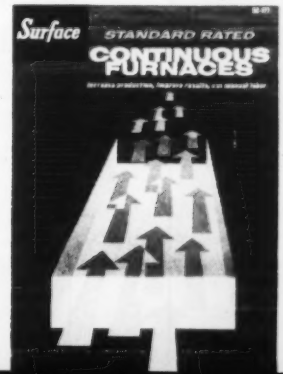

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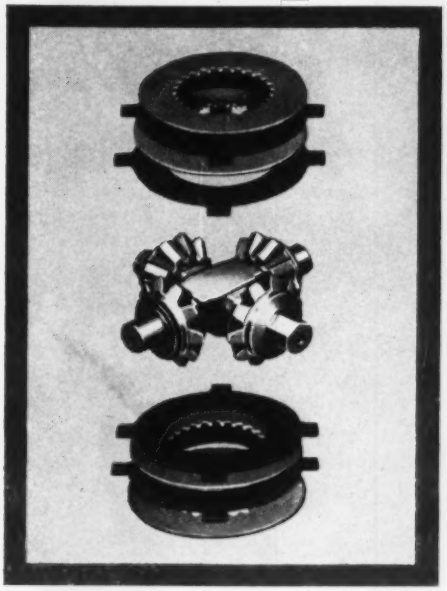

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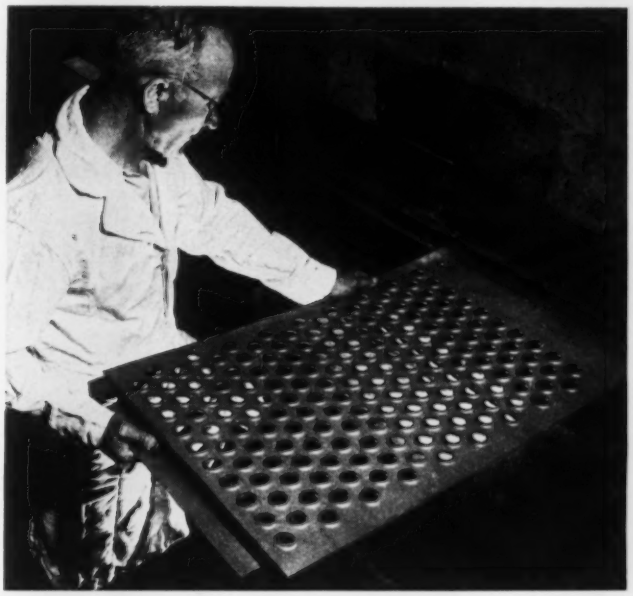

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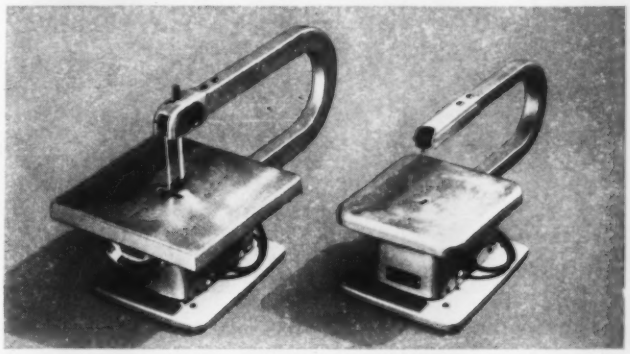

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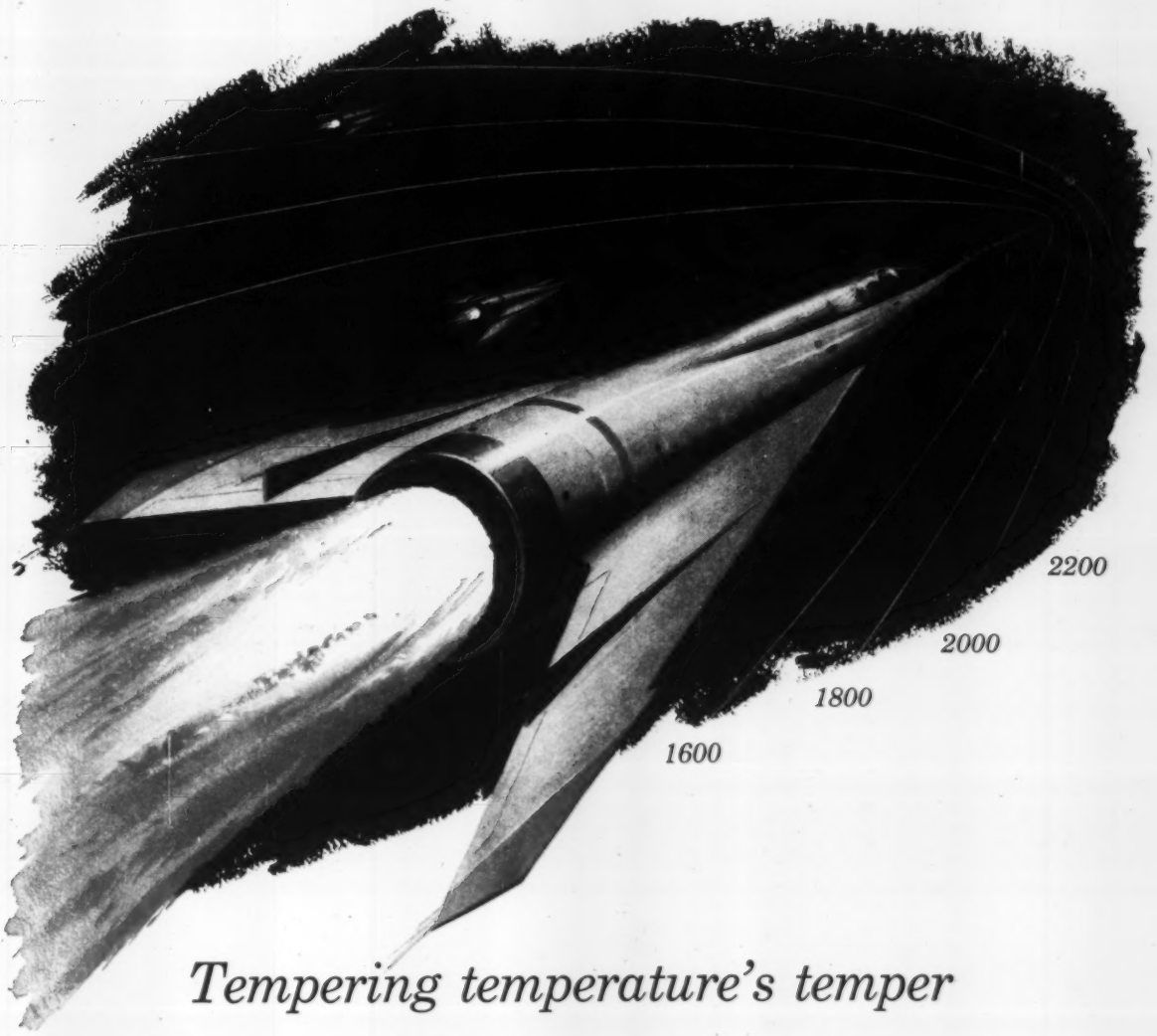

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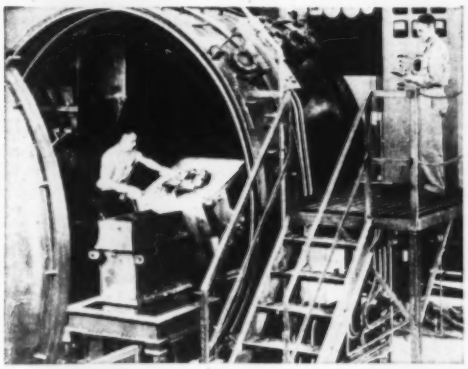

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Apr. 20-22, Metal Powder Industries Federation: Annual meeting and powder metallurgy show, Sheraton-Cadillac Hotel, Detroit. Federation's address: 130 W. 42nd St., New York 36, N. Y. Executive secretary: Kempton H. Roll.

Apr. 21, Material Handling Institute Inc: Membership meeting, Sheraton-Cleveland Hotel, Cleveland. Institute's address: 1 Gateway Center, Pittsburgh 22, Pa. Managing director: L. West Shea.

Apr. 21-23, American Society of Lubrication Engineers: Annual meeting, Statler-Hilton Hotel, Buffalo. Society's address: 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: Calvert L. Willey.

Apr. 22-24, American Zinc Institute Inc. and Lead Industries Association: Annual meetings, Drake Hotel, Chicago. Information: Lead Industries Association, 60 E. 42nd St., New York 17, N. Y. Secretary: Robert Ziegfeld.

Apr. 22-26, Metal Treating Institute: Spring meeting, Hollywood Beach Hotel, Hollywood, Fla. Institute's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

Apr. 23-24, American Society of Mechanical Engineers and Society for the Advancement of Management: Joint management conference, Statler-Hilton Hotel, New York. Information: Meetings Department, ASME, 29 W. 39th St., New York 18, N. Y.

Apr. 23-24, Wire Association: Eastern meeting, Statler-Hilton Hotel, Boston. Association's address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

Apr. 25-30, Scientific Apparatus Makers Association: Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association's address: 20 N. Wacker Dr., Chicago 6, Ill. Executive vice president: Kenneth Andersen.

Apr. 26-29, Chamber of Commerce of the United States: Annual meeting, National Chamber Bldg., Washington. Information: Chamber of Commerce of the United States, 1615 H St. N. W., Washington 6, D. C.

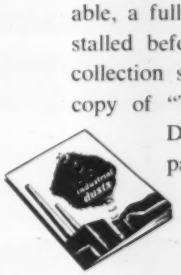
Apr. 26-29, National Screw Machine Products Association: Annual meeting, Roosevelt Hotel, New York. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Apr. 27-29, Association of Iron & Steel Engineers: Spring conference, Statler-Hilton Hotel, Buffalo. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

What the boss doesn't know ...HURTS

Waste of process materials is a serious matter . . . yet hundreds of plants unknowingly permit it. Tons of valuable material may be lost every week as "dust" created in your manufacturing processes. The loss in dollars may be huge. This loss can be stopped: eight out of ten Buell Dust Recovery Installations pay for themselves completely.

Your plant's dust recovery potential can be analyzed by Buell engineers without cost or obligation. Where desirable, a full-scale-operating Test Precipitator can be installed before your plant invests in a permanent dust collection system. For further information, write for a copy of "The Collection and Recovery of Industrial Dusts": Dept. 26-D, Buell Engineering Company, Inc., 123 William St., New York 38, N. Y.



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Experts at delivering Extra Efficiency in

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FRASSE ALUMINUM

helps tell how she's doing!

Ballistic missile success hinges on intelligence obtained in test firings. Tracking data – reporting velocity, direction, altitude, temperature, etc. is vital – when processed, it guides critical design changes.

Heart of the intricate data processing system at Cape Canaveral is a Potter Magnityper – a high speed electronic printer that decodes raw material . . . then stores, collates, interprets and prints at 72 *thousand* characters per minute. Lightweight, non-magnetic aluminum is essential to its efficient operation – that's why the Magnityper is made almost completely of Frasse aluminum.

Frasse ships the required sizes quickly from stock – in the grades that contribute to its ease of fabrication *and* performance. For example, Frasse supplies 2024-T4 bars for *strength* and *machinability*, 5052-H34 sheet for *formability* and *weldability* and "775" tooling plate for *dimensional accuracy* with *no distortion when worked.*

Perhaps these same qualities can increase the efficiency of *your* product – or reduce fabricating costs. It's worth investigating – and a Frasse aluminum specialist will be glad to help. There's no obligation – simply write or call your nearest Frasse office. You'll be glad you did.

Call FRASSE for ALUMINUM

Screw Machine Stock • Bars • Rods • Wire Sheets • Plates • Tubing • Holobar Pipe • Fittings • Valves • Extrusions Tool and Jig Plate

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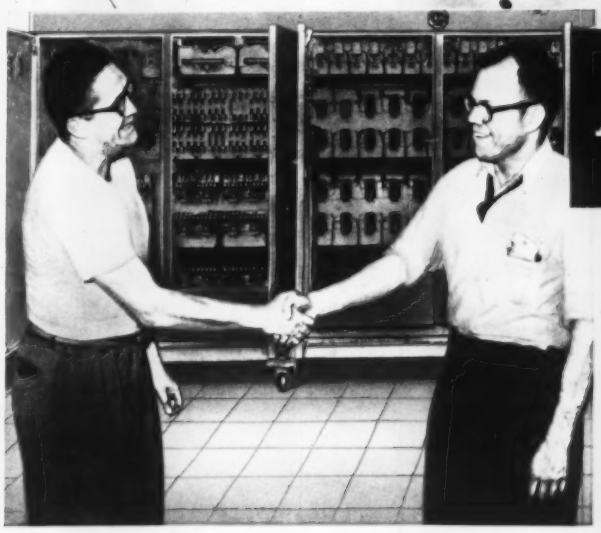
Precision Guidance of Nearly a Mile of Plate Glass...



A series of control panels such as this is used in the Pittsburgh Plate Glass cutting room. Above are shown the Allen-Bradley engineers after completing the factory testing of the final panel.

controls by ALLEN-BRADLEY of course!

The New Pittsburgh Plate Glass Plant at Cumberland, Maryland, heralds a new era in the art of plate glass making. Night and day, a continuous ribbon of glass is fed to a nearly mile-long process line. Then a complex control system directs the automatic cutting, sorting, and conveying of the glass to six areas, according to a continuously varying program.

Special control panels which integrate portions of this equipment into a unified, smoothly operating system were designed, developed, and engineered by Allen-Bradley. You can benefit by this extensive control experience . . . it is a "plus" value when you specify Allen-Bradley *quality* motor control.

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

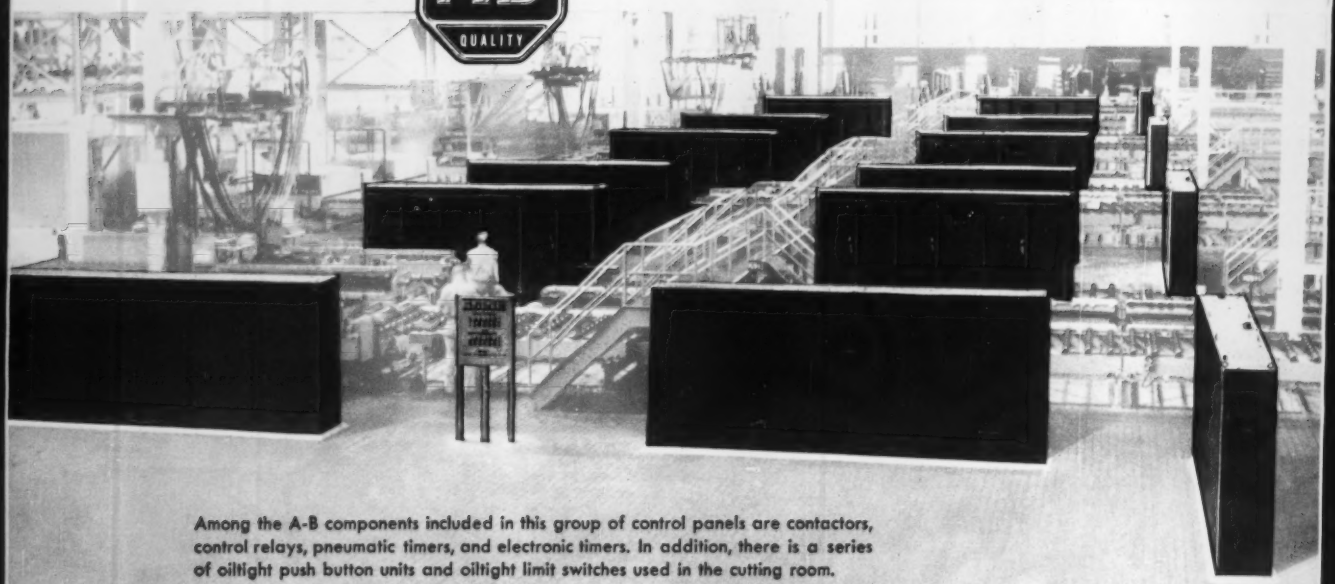
See on the next page how A-B Controls do it...

5-59-MR

Plate Glass made by the mile

with reliable ALLEN-BRADLEY Controls

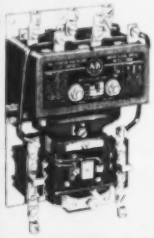
In the cutting room at Pittsburgh Plate Glass (below), Allen-Bradley controls prove the reliability of their "simple design." All A-B solenoid starters, contactors, and relays have only ONE moving part . . . assuring *millions* of trouble free operations. There are *no* bearings or jumpers to cause trouble. Contact maintenance is also eliminated—A-B double break, silver alloy contacts remain in perfect operating condition until completely worn away. Insist on Allen-Bradley *quality* motor controls . . . you cannot do better!



Among the A-B components included in this group of control panels are contactors, control relays, pneumatic timers, and electronic timers. In addition, there is a series of oiltight push button units and oiltight limit switches used in the cutting room.

Some of the standard components which are used in this plant

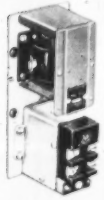
Contactor—Bulletin 702, Size 3 shown. Made up to Size 8, rated 1350 amps, 220-550 v.



Solenoid Starter Bulletin 709, Size 2 shown. Made in ratings to 450 hp, 220v; 900 hp, 440-550 v.

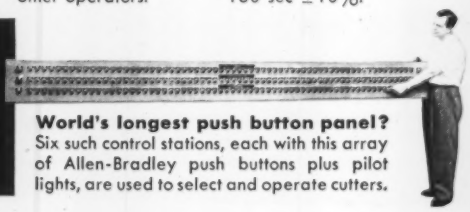
Control Relay—Bulletin 700. Universal type relay with both N.O. and N.C. contacts shown.

Limit Switch—Bulletin 802T. Oiltight roller lever type shown. Also with many other operators.



Pneumatic Timer Bulletin 849 for on-delay or off-delay. Range from 1/20 to 180 sec ±10%.

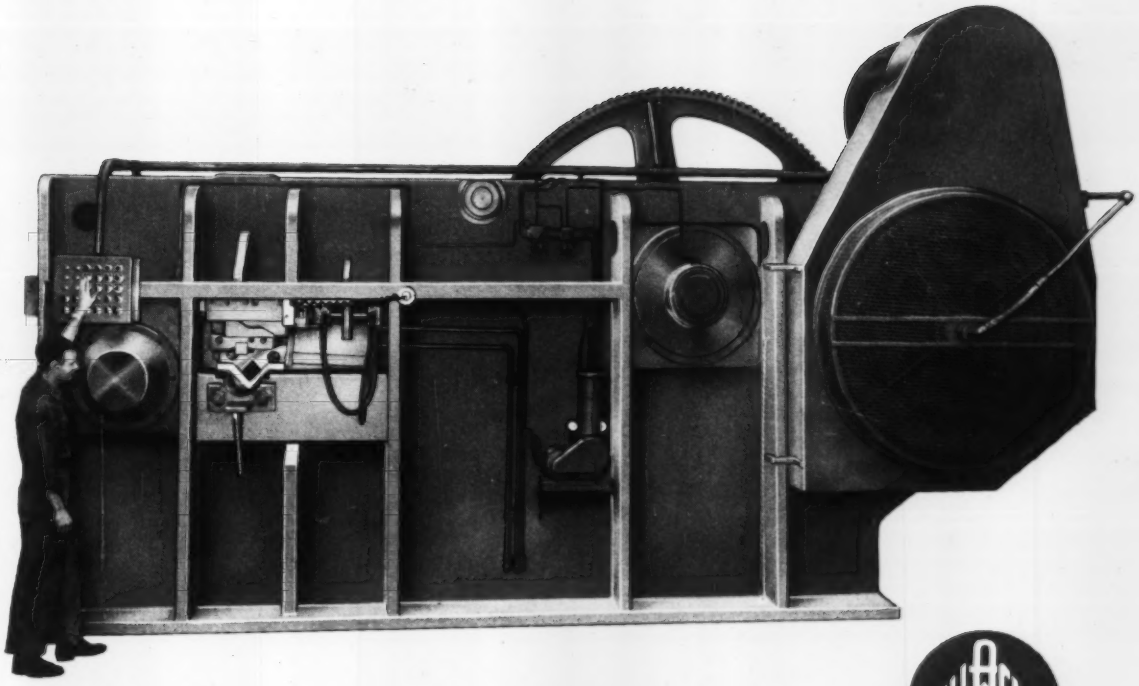
ALLEN-BRADLEY
Quality Motor Control



World's longest push button panel? Six such control stations, each with this array of Allen-Bradley push buttons plus pilot lights, are used to select and operate cutters.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

5-59-MR



HILL ACME
HEAVY DUTY BAR-BILLET SHEAR
for production cutting of heavy billets

SIMPLE DESIGN — The No. 1200 HILL ACME BAR-BILLET shear cuts large diameter squares of various tensiles. The basic principle of the lever and fulcrum is employed to insure maximum efficiency with low power input.

HIGH PRODUCTION — With a free running speed of 26 cuts per minute the production of square, accurate lengths will appreciably reduce cutting costs.

VERSATILE — Knives will accommodate many sizes of rounds, flats, squares or special shapes without the necessity of knife change.

LOW COST — Initial machine cost is attractive and maintenance cost comparisons are impressive.

PROVEN EFFICIENCY — Now proven through four years of successful operation in nationally known plants. Available with fully automatic, semi-automatic or hand feed.

SIZE RANGE — HILL ACME BAR-BILLET shears are made in a range of sizes to efficiently accommodate every commercial requirement. Available in either right or left hand models.

Bulletin BB-59 gives complete details.

The HILL ACME Company

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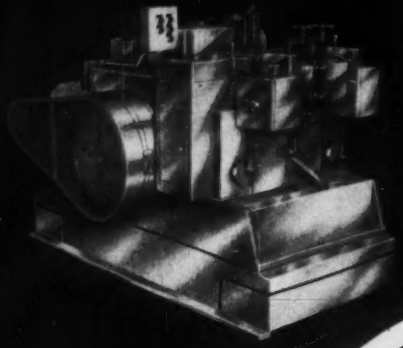

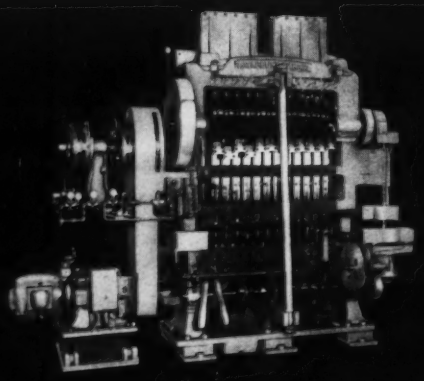

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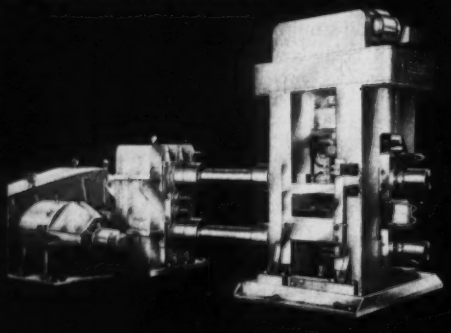

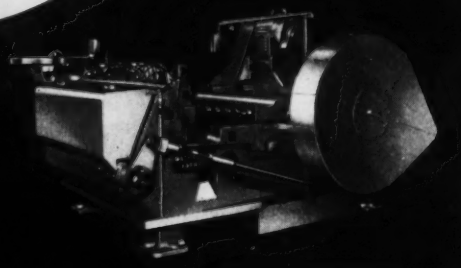

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WF 57

Are You Sure You Are Using the BEST Wire for Your Application?

•Ask yourself this question—then let PAGE work with you to determine the *exact* wire specification best suited to your need. We have helped many manufacturers *add value* to their product *without increasing their cost.*

Here at PAGE we are in an ideal position to work with wire users in developing better wire for specific needs. PAGE is a specialty wire mill. Manufacturing wire has been our sole business since 1902.

Our engineering and production staffs regard wire as an important tool which can be designed and made to fill the exact requirements of our customers. For example: PAGE *Special HB*, with tensile strength approximating that of music wire. This *Special HB* Wire meets many requirements where music wire was previously considered a necessity—at cost savings for our customers up to 60%!

Over the years PAGE has maintained a progressive attitude which has pioneered many "**firsts**" in the wire business. Among this list are items such as—

The first adoption of the patenting process in the U.S.
" " to use Tungsten Carbide Dies
" " to produce and promote Stainless Steel Strand
" " Woven Wire Fence
" " Stainless Steel Fence
" " All-Aluminum Fence
" " commercial producer of Aluminized Wire

Above all, PAGE is a dependable wire source. Many of our customers have grown with PAGE for nearly half a century. PAGE experience, talents and facilities are available to you at all times. We will be glad to work with your people in analyzing your wire needs, and if found advisable, in developing a new wire specification which may add to the usefulness and value of your own product.

PAGE - a Dependable Source for MANUFACTURERS' WIRE

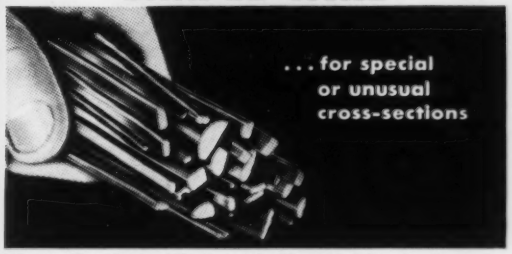
Partial list of PAGE Wire materials, sections and special purpose wires:

MATERIALS	SECTIONS
Low Carbon	Rounds
High Carbon	Half Rounds
Low Alloy	Ovals... Flats
Stainless Steel	Half Ovals
Armco Ingot Iron	Squares
Aluminized	Special Shapes

SPECIAL PURPOSE WIRES

Aircraft	Signal Corps
Antenna	Spiral Binding
Armature Banding	Spring, Mechanical
Belt Hook	Spring, Upholstery
Broom	Stapling
Buckle	Stitching, Automotive
Button Fastening	Strand
Clip	Telephone
Core (ACSR)	Telegraph
Hairpin	Thermocouple
Lashing	Tire Bead
Lock Washer	Weaving
Safety, Lock	Welding
Shaped	—and others

PAGE - a Dependable Source for SHAPED WIRE



Many Grades • We furnish Shaped Wire in Low or High Carbon, Aluminized, Low Alloy or Stainless Steel, and in Armco Ingot Iron.

Many Sizes • Cross-section areas to and including .0625 sq. in. Flats and rectangles to 3/8" (width-thickness ratios to 6:1). Also rounds, half rounds, ovals, half ovals, squares, and specials.

Packaged Right • PAGE Shaped Wire—in standard or special coils or in random, exact or multiple lengths, is packaged as you want it: bare bundles, waterproof paper-wrapped, burlapped, boxes, cartons, Leverpaks—palletized on request.

***(SPECIAL NOTE** • We do not stock finished shapes We manufacture to customer specification)*

PAGE - a Dependable Source for WELDING WIRE

33 different analyses for: heavy automatic or light manual submerged arc; inert gas manual; automatic, tungsten or metal arc; oxy-acetylene gas welding.

Wide Analysis Range...*Any carbon* from Armco (.025 max.) to high carbon (.70-.84); all the most popular welding grades of *low alloys;* all standard AISI grades of *stainless.* Other types on request.

Gas Rods...Medium or high carbon steel, mild steel, Armco, low alloy, stainless steel, manganese or naval bronze.

Bare Electrodes...Any carbon from Armco to high carbon (.70-.84).

Metal Spray Wire...Any carbon from Armco to .80 carbon, low alloy, stainless steel, manganese or naval bronze.

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☐ Shaped Wire ☐ Welding Wire ☐ Aluminized Wire
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Page Steel and Wire Division
AMERICAN CHAIN & CABLE

ACCO

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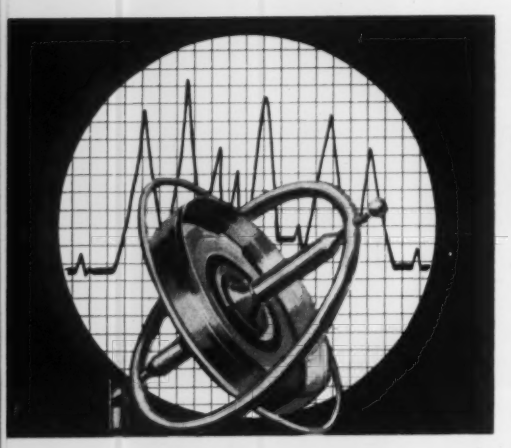

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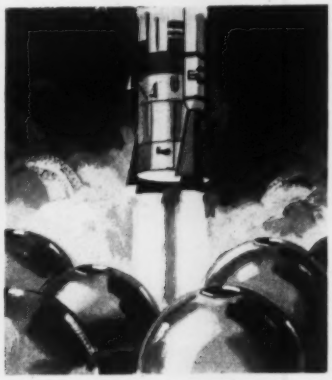


c

d

a. Titanium slabs are heated prior to rolling into continuous sheet coils. Crucible's increased capacity for producing high purity metals, in all sizes and mill forms, is substantially reducing costs and delivery times.

b. ***Vacuum Melted Alloys*** *are specified for gyroscope balls used in navigational and fire direction systems. The metals' improved properties facilitate miniaturization.*

c. ***Titanium*** *helium storage bottles for ICBM Atlas. Titanium, which must be vacuum melted, was selected because of its high strength weight ratio, cold-resistant properties and corrosion resistance.*

d. ***Basic Melting Processes.*** *Vacuum induction melting produces "purer" metals than conventional air melting because it eliminates all sources of contamination except the crucible. Vacuum arc remelting eliminates the crucible and permits production of ingots up to 18,000 lbs.*

VACUUM MELTING CREATES

Marked improvements in properties produced by High-Purity Metallurgy

Behind the development of space-age metals with entirely new characteristics is vacuum melting – a series of processes that produce "purer" metals with better properties.

Why Vacuum Melt? Vacuum melting protects molten metal from contact with air. It also provides closer control of composition, helps eliminate inclusions, and minimizes center porosity and segregation in ingots.

In the field of vacuum melting, Crucible's position is unique. As the leading producer of special purpose steels, Crucible's experience in high-quality steelmaking is unsurpassed. Through formerly affiliated companies, now fully integrated with it, Crucible led in the development and commercial production of vacuum-melted steels, iron, nickel, copper – and titanium. Therefore, Crucible's breadth of experience, together with its extensive facilities, places the company in the best position to provide the "super-quality" metals most suitable for any given application.

The three vacuum-melting processes – One of the Crucible processes is VIM – *vacuum induction melting*. It starts with very high-purity raw materials, produces extremely pure ingots. A second is VAR – *vacuum arc remelting*, or the consumable electrode process. This process, starting with air-melted electrodes, produces large ingots – up to 32″ diameter x 18,000 lbs. It provides

a

SUPER-DUTY METALS

metal with low-gas content and greatly improved uniformity of properties. The third process is VIR — *vacuum arc remelting of vacuum induction melted electrodes*—a double-melting technique. It permits manufacture of super-pure metals in the full range of ingot sizes.

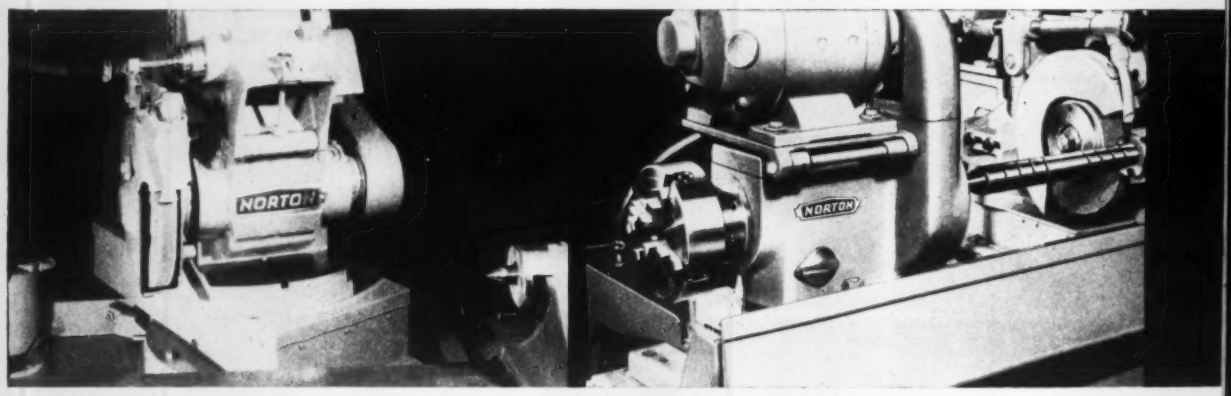
Crucible's experience with all three processes, and its facilities for vacuum arc remelting its own specially air- or vacuum-melted electrodes, provides industry with a complete range of vacuum-melted metals at the lowest possible cost. Only at Crucible is there available this experience, flexibility and the facilities for vacuum-melting titanium, superalloys, heat-resisting alloys, bearing steels, tool steels, stainless steels, electronic alloys and nuclear reactor materials.

If you'd like to know more about Crucible's work in High-Purity Metallurgy, read: "Quality Aspects and Properties of Vacuum Induction Melted and Vacuum Arc Remelted Steels and Super Alloys" and "Titanium for Aircraft and Spacecraft". Write: *Crucible Steel Company of America, Dept. AD15, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE STEEL COMPANY OF AMERICA

With fast change-over features like these...

Norton Universal Grinders do more...save more



The flexible grinding wheel head swivels above and below the slideways, permitting independent angular settings of wheel and feed — giving you the widest job range.

You can change from dead center to chucking work with minimum effort. Chuck remains mounted at back end of headstock when grinding "on centers".

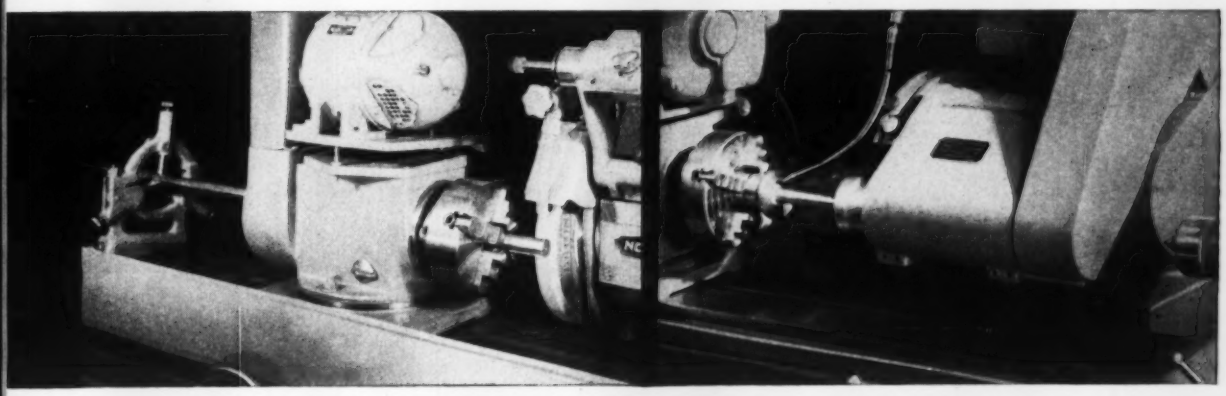
A Norton 12" Type U-4 Universal Grinder, available with 36" or 48" nominal lengths between centers, typical of Norton Universals.

Install any Norton Universal Grinder and you've got a practically complete grinding department — for faster external, internal, face, taper and angular wheelslide grinding, including many special jobs. That's because Norton builds exceptional versatility into all these famous universals, with time-and-money-saving "Touch of Gold" advantages like the following:

Extremely rapid chucking . . . quick change-over to live or dead spindle operation . . . wide range of easily changed work speeds . . . independent wheel and feed settings for doing difficult jobs fast . . . extra capacities in wheel head and headstock . . . precise swivel table alignment with the SWIVALIGN* *Dual Electric Indicator and semiautomatic plunge feed arrangement optional extras.*

Engineered for long service life in handling so many different jobs, Norton Universal Grinders are easy to operate and maintain. Their swing capacities range from 10" to 18". Your Norton Sales Engineer, a trained expert in the grinding field, will be glad to help you select the size you need — and to give you an accurate estimate of what this grinder can do for you. NORTON COMPANY, Machine Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries



Hollow headstock spindle gives you additional capacity for grinding long bars by passing them clear through and supporting them in grinding position.

Hinged-bracket type internal grinding spindle swings up and out of the way when not in use. This means quicker set-ups for your I.D. or O.D. grinding.

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Good bet: You're paying for lubricants you don't need

Does this case sound familiar to you?

A midwest firm was buying lubricants on the recommendation of every department head, foreman or even operator. Inventory — often duplicated — was scattered all over the plant, yet shortages in one spot were never related to overstocks in another. The result: costly overstocking, extra handling, increased dangers of misapplication.

Management realized they had a problem — instituted an Organized Lubrication Plan. Now they use 20 lubes instead of 97, have cut their purchase orders from 300 to 12 per year. Direct savings are estimated at thousands of dollars annually.

Can Organized Lubrication save money in your plant? Contact your local Texaco Engineer or write for:

"Management Practices that Control Costs via Organized Lubrication."

The Texas Company, 135 East 42nd Street, New York 17, N. Y., Dept. S-82.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

Man's Eternal Struggle with the Machine

AS PROFITS SHRINK AND COSTS CONTINUE TO GO UP, MORE THAN JUST "THE VENDOR'S QUOTATION" IS NEEDED!

Certainly you have to depend on your vendors . . . but how much?

The answer is "completely"! Your job is tough enough without your having to be a machine design or materials handling expert, too.

When you're specifying equipment, you should *only* have to provide an objective explanation of the problem, as well as the understanding of the product and related processes.

The vendor is the expert who's supposed to analyze that problem, then design and supply the necessary equipment. And the equipment should be ready to do your job when it's installed, too. Your overhead can't afford the lost production time and expense while you test and prove the vendor's equipment for him. After all, your original specifications called for equipment *to do a particular job.*

Sciaky has always accepted the vendor's full responsibility for design, manufacture and *delivery into production* according to the original specifications. That's why Sciaky resistance welding and production equipment satisfies the requirements of *your* particular job. That's why Sciaky operates the only independent, fully staffed and equipped Research Center devoted to advancing the application of resistance welding processes.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

The manufacturers of automobile wheels took that advantage. As a result those wheels are now assembled with automatic resistance welding that includes four other operations—not only assembled better, but faster and at lower cost. Write for the details of this unusual high production application that satisfies the most rigid specifications for weld quality.

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65A

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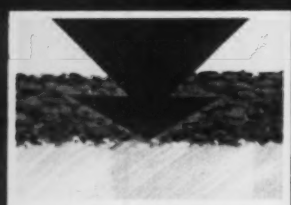

PENETRATES RUST TO BARE METAL

The specially-processed fish oil vehicle in the Rust-Oleum 769 Damp-Proof Red Primer penetrates rust to bare metal – as proved in radioactive tracing studies.

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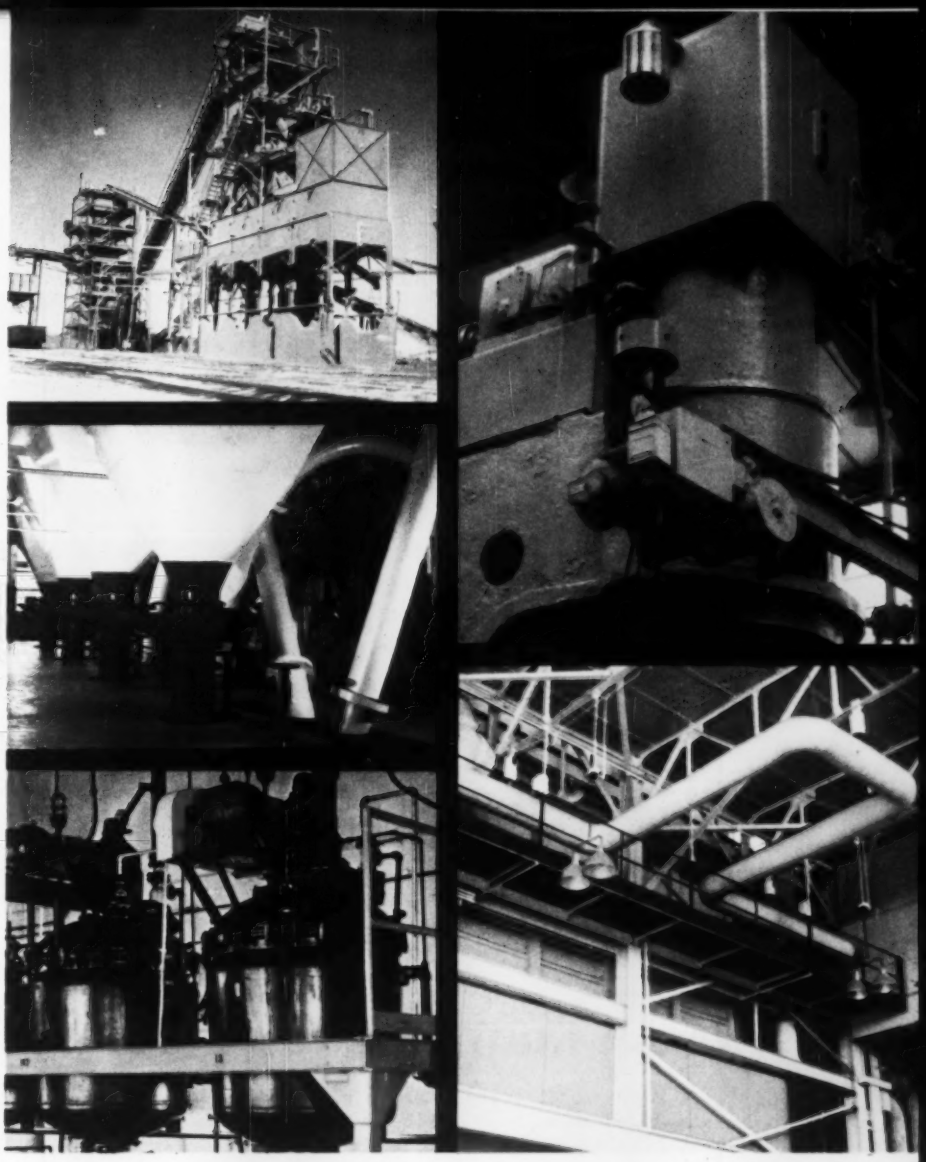

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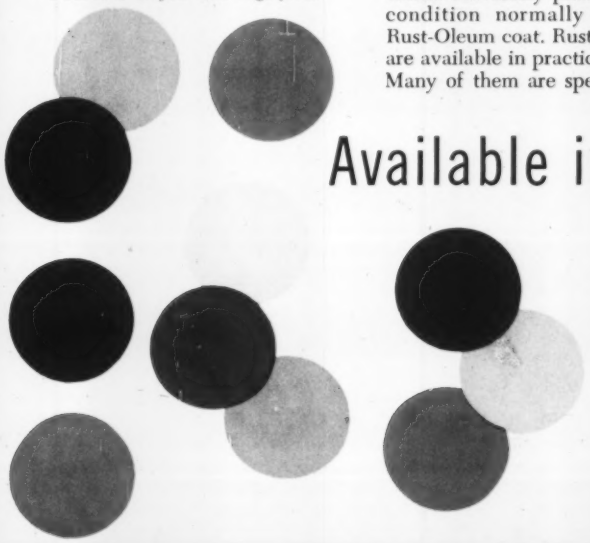

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Description and Location
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Repair gallery in Bay No. 2
Repair P_2SO_4 supply line (corroded)
Replace safety plate receiving dock G
Replace 100' corrugated galvanized siding south areaway
Replace welded grating in foundry
Replace machine guard in compressor room
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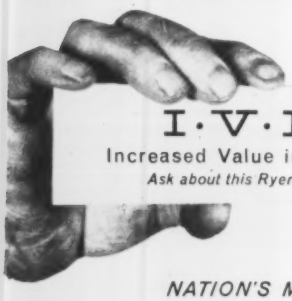

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Productivity: Bogey in the Wage Talks

It will pay you to take another look at the thorny issue of productivity. One of the most variously interpreted of economic concepts, it will be a key issue in coming steel wage talks. Its definition (or lack of agreement on one) could determine the course of negotiations (Page 47). The outcome will determine what you have to pay for steel and what new pressures will bear on your own employment costs. The steel union claims productivity is merely output per manhour. Companies say much more is involved—including equipment costs, taxes, maintenance expenses and other overhead.

First Quarter Steel Earnings Up

Record first quarter earnings are reported by Jones & Laughlin Steel Corp., leading a parade of much improved steel company reports. J&L earned $15,738,000, the highest since its 1956 first quarter of $13.5 million and well above the 1958 first quarter level of $1,657,000. Allegheny Ludlum Steel Corp. earned $4,549,542 last quarter, topping its 1958 figure of $725,900. Granite City Steel Co. reports net income of $3,465,763 for the period, against $2,055,182 in 1958. Crucible Steel Co. of America marked up quarterly net income of $3,500,000 compared with first quarter 1958 earnings of $172,395. Lukens Steel Co. is the first to report a lower first quarter; net income stood at $1,008,394 in the first 12 weeks this year, compared with $1,470,230 in the opening period of 1958.

Aluminum Forgings Back in Race

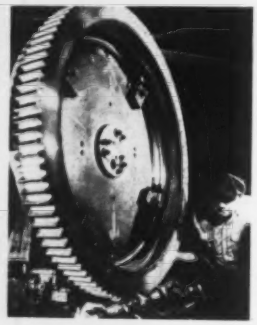
Watch for a comeback in aluminum forgings, which have been running last in aluminum markets. Shipments in 1958 were only half of the record mark set five years earlier. Forgings now are competitive in cost with other fabricated shapes and have superior properties, claims Kaiser Aluminum & Chemical Corp. Kaiser is so enthusiastic about the market potential it has just poured $5 million into its Erie, Pa., facilities (Page 50).

Congress Weighs Unemployment Role

Congress has opened hearings on one of two bills calling for federalizing and increasing the unemployment compensation plans of states. All states have such programs; the U. S. Chamber of Commerce says the average weekly benefit is a taxfree $30.45. More than 75 per cent of all covered

workers are in states which pay benefits for at least six months, and most beneficiaries can collect at least half normal pay for the plan's duration. Pending bills would impose federal requirements on each state program. They would require bigger benefits for nine months and would make a worker eligible for full benefits after being on a job five months.

Choosing Material Is Cost Decision



One gear manufacturer has cut machining time in half by switching to leaded steel forgings for large gears like this one. It's an example of how you can rack up savings by choosing the right material for the job. Other manufacturers are lowering their costs by switching to materials that meet requirements but cost less. The key to proper material selection is a knowledge of the cost factors involved in the job. The editors of STEEL offer help in this vital area (Page 84).

Contractors Attack Kennedy-Ervin Measure

A lively and determined stand against the "prehire" section of the Kennedy-Ervin labor bill has been taken before the House Education and Labor subcommittees by the Associated General Contractors of America Inc. Frank J. Rooney, chairman of the association's labor committee, testified that the provision is "ill advised and ill conceived" and would "virtually give any labor union official a blank check with no safeguards or controls, and would cause untold labor abuses." The section would permit labor unions not representing construction workmen to make labor agreements with contractors. Where the agreements are in force, all workmen employed on the construction project would be required to join the union within seven days or be fired.

Hot Pace Ahead for Nodular Pipe

Look for a terrific production increase in nodular graphitic pipe and fittings. Last year, production was a mere 6500 tons. It is expected to reach 40,000 tons this year and top 125,000 tons in 1960. Nodular pipe is being used in gas and water mains and by the chemical, petroleum, and marine industries. Its ability to withstand hard service, good corrosion resistance, and economy are cited as reasons for its popularity (Page 119).

Nodular Graphitic Iron Pipe & Fittings

(Production in tons*)

1958	6,500
1959	40,000
1960	125,000

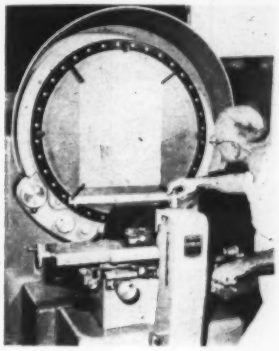
*Estimated.

Taking the Measure of Monopoly

If your firm happens to be one of eight (or fewer) companies doing 50 per cent of the business in a given line of commerce, you may be in for federal price surveillance. The Senate Antitrust & Monopoly subcommittee

this week opens hearings on a bill which would require such a company to give the Federal Trade Commission 30 days' notice of any price increase. "Line of commerce" has been defined only by the FTC, so that agency would have a free rein to pick those to testify at public hearings. The government could not block an increase, but it wants hearings to stir up public opinion and be a restraining influence on price policies.

Optical Gaging Pinpoints the Error



If you're measuring irregular contours, you'll be interested in optical gaging equipment. Contour projectors, made by Eastman Kodak Co., Rochester, N. Y., not only tell you when dimensions are wrong; they also pinpoint and measure the error. They're used at the steam division of Westinghouse Electric Corp., Lester, Pa., to inspect turbine blades and the gages used to make them. An image of the part is cast on a chart of the right contour, mounted on the projector screen, and variances are immediately apparent (Page 100).

Rail Car Suppliers Mark Time

A boom for suppliers of railroad car parts is on the horizon, if the rails, or the government, are able to start financing badly depleted rolling stock. Partmakers can expect to supply independent carbuilders when, and if, the orders start. Their markets will also expand if a resurgence develops in railroad company owned shops. Best prospects are for firms which make electrified railyard equipment of the pushbutton type. Carbuilders report that in March, independent shops had orders for 8085 cars; company shops had orders for 20,704 cars.

Plant Security Can Curb Losses

You plant managers may be overlooking one of the continuing drips from the cost faucet if you haven't taken a look at your plant security lately. Though individual losses may be small, one insurance company estimates that business loses close to $1 billion yearly through employee dishonesty, forgery, and burglary. Fire casualties are as great. An adequate fire protection system can pay for itself in six to ten years through reduced insurance rates. Perhaps as few as two plant guards can reduce pilferage and machinery damage (Page 54).

Variety Is Spice of Aircraft Industry

"The classic airplane business is changing rapidly," says Robert E. Gross, chairman of Lockheed Aircraft Corp., Burbank, Calif. Lockheed, which

just bought Puget Sound Bridge & Dredging Co., Seattle, is only one of the major airplane builders developing diverse product lines. Others: Douglas Aircraft Co. also markets lightweight building materials, hydraulic fluid, microfilm; Boeing Airplane Co., small turbine engines; McDonnell Aircraft Corp., the first NASA space capsule; Bell Aircraft Corp., valves and pressure switches, foundry equipment, hydraulic presses.

Pipelines in Lull After the Storm

Supreme Court reversal of the controversial "Memphis Case" was expected to unleash a flood of requests for pipeline projects. But it hasn't materialized. Actually, the Federal Power Commission booked more pipeline applications before the high court spoke last December. But some big jobs are on tap; so the pipeline operators are gambling by buying pipe before getting FPC approval (Page 59).

GM Posts 'No Fishing' Signs

General Motors Corp. lawyers have charged the Justice Department with launching a "politically inspired fishing expedition" in the opening round of the government's antitrust investigation of the auto company. GM accused the department of shackling the corporation with a staggering burden of searching hundreds of thousands of file drawers to produce records dating back to 1929. Moving to quash the government subpoena in U. S. District Court, GM won an order requiring the Justice Department to show cause why the subpoena should not be thrown out.

Mergers Rise in First Quarter

First quarter reports show an increase in corporate acquisitions over previous first quarters, says the Federal Trade Commission. A total of 260 acquisitions is reported in both manufacturing and nonmanufacturing industries; 84 in January, 80 in February, and 96 in March. The first quarter total was 227 in 1958, 249 in 1957, and 243 in 1956. The reports are not firm figures on completed mergers, says the government, but refer to mergers reported under negotiation during the period.

Straws in the Wind

Canada's first privately owned nuclear research reactor has been started up at McMaster University, Hamilton, Ont. It was supplied by AMF Atomics (Canada) Ltd., subsidiary of American Machine & Foundry Co. . . . A quiet and orderly gathering of the jobless in Washington may have been influenced by a report of declining unemployment. George Meany demanded its release before the meeting . . . Engineering degrees conferred by colleges in 1957-58 climbed to a high of 35,332, 13.1 per cent over the previous year . . . Steel company stockholders (1,026,825) outnumbered steelworkers by 43 per cent at the end of 1958 . . . The Federal Reserve Board's industrial production index hit a new peak of 147 (seasonally adjusted) in March (1947-49 = 100).

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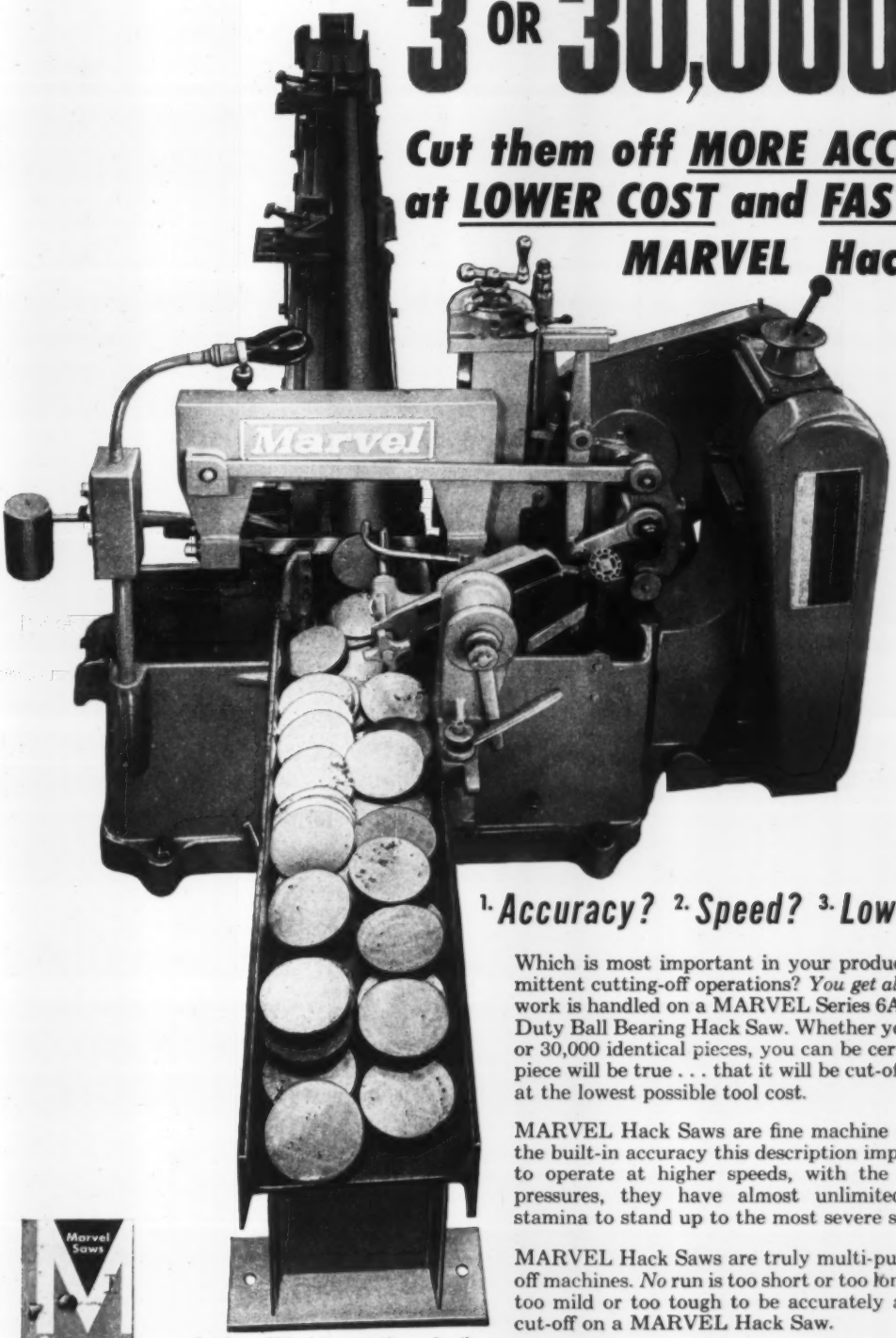

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MARVEL Hack Saws are truly multi-purpose cutting-off machines. *No* run is too short or too long, *no* material too mild or too tough to be accurately and efficiently cut-off on a MARVEL Hack Saw.

Marvel Saws

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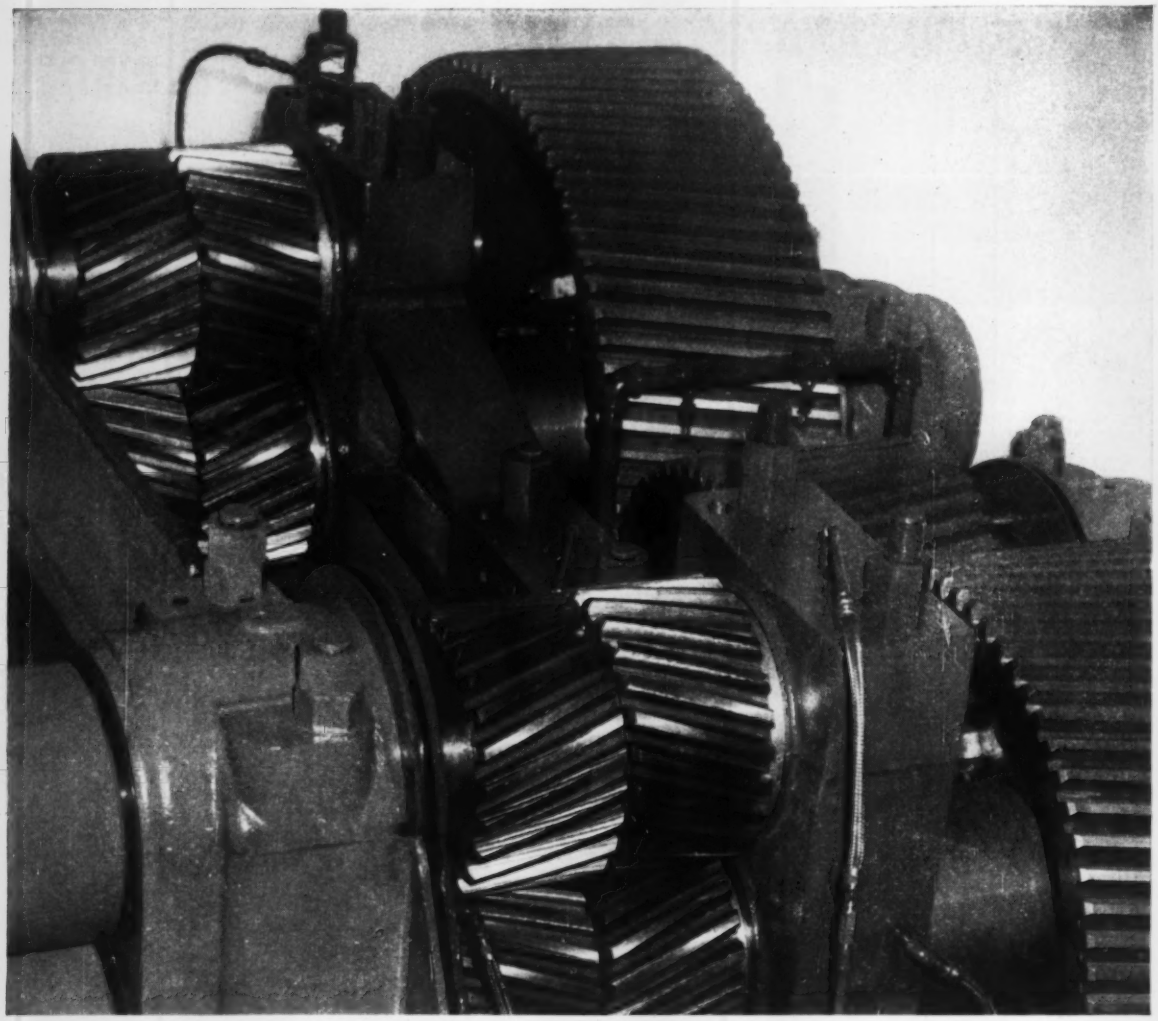

Rolling mill pinions of Type 4620 nickel-molybdenum steel have a good hard case (500/550 Brinell) plus toughness, stand up to severe overloads. Made by Morgan Construction Company, Worcester, Mass.

4620 Nickel alloy steel gives them 4 times longer service

Hardened rolling mill pinions in an Eastern steel plant were not giving satisfactory service, due to continuous overloading. They just weren't tough enough to take the beating of heavy rolling.

Designers solved the problem – called for pinions of 4620 nickel-moly carburized steel ground after hardening. Now they've got a good case – pinions don't crack . . . tough cores support them.

This case stood up – the 4620 nickel alloy steel pinions have served over *4 times longer* than the old through-hardened pinions . . . and are still going strong.

This high-performance pinion was *not* difficult to make. It was rough-machined at a hardness of 187/220 Brinell; showed little distortion through carburizing and hardening. Only 0.005" was needed for finish grinding, after hardening to 500/550 Brinell.

Parts that take a beating in heavy equipment must also have practical service life – you get both in nickel alloy materials.

For practical information on 4620 nickel alloy steel and its application to your specific metal problems, write Inco's Development and Research Division.

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INCO NICKEL
NICKEL ALLOYS PERFORM BETTER LONGER

Nine Week Steel Strike?

Anywhere you go these days, the prevailing questions are:

Are we going to have a steel strike?

If so, how long will it last?

Frankly, we don't know, and neither does anyone else.

But we do know that in the midst of recovery, the chances are 99 to 1 that USW President David McDonald will pull his workers off their jobs on June 30.

But perhaps there is no better time for a showdown.

Most consumers have been loading up on steel and will be in a comfortable inventory position for several weeks after June 30.

Industrial production, as measured by the FRB index, is 14 points above where it was a year ago and may average 144 to 148 for the year. During the 1956 steel strike, the FRB metal fabricating index actually increased.

Gross national product, measuring the activity of the economy as a whole, may set a record of $470 billion to $472 billion this year—$32 billion to $34 billion better than the 1958 mark.

People with money are still willing to spend it, as evidenced by the 10 per cent increase in department store sales over last year's.

Under such circumstances, Mr. McDonald's position is not favored by strong antistrike sentiment.

But he's in a bind. After turning down the steel industry's recommendation to freeze wages and benefits a year, he can't retreat.

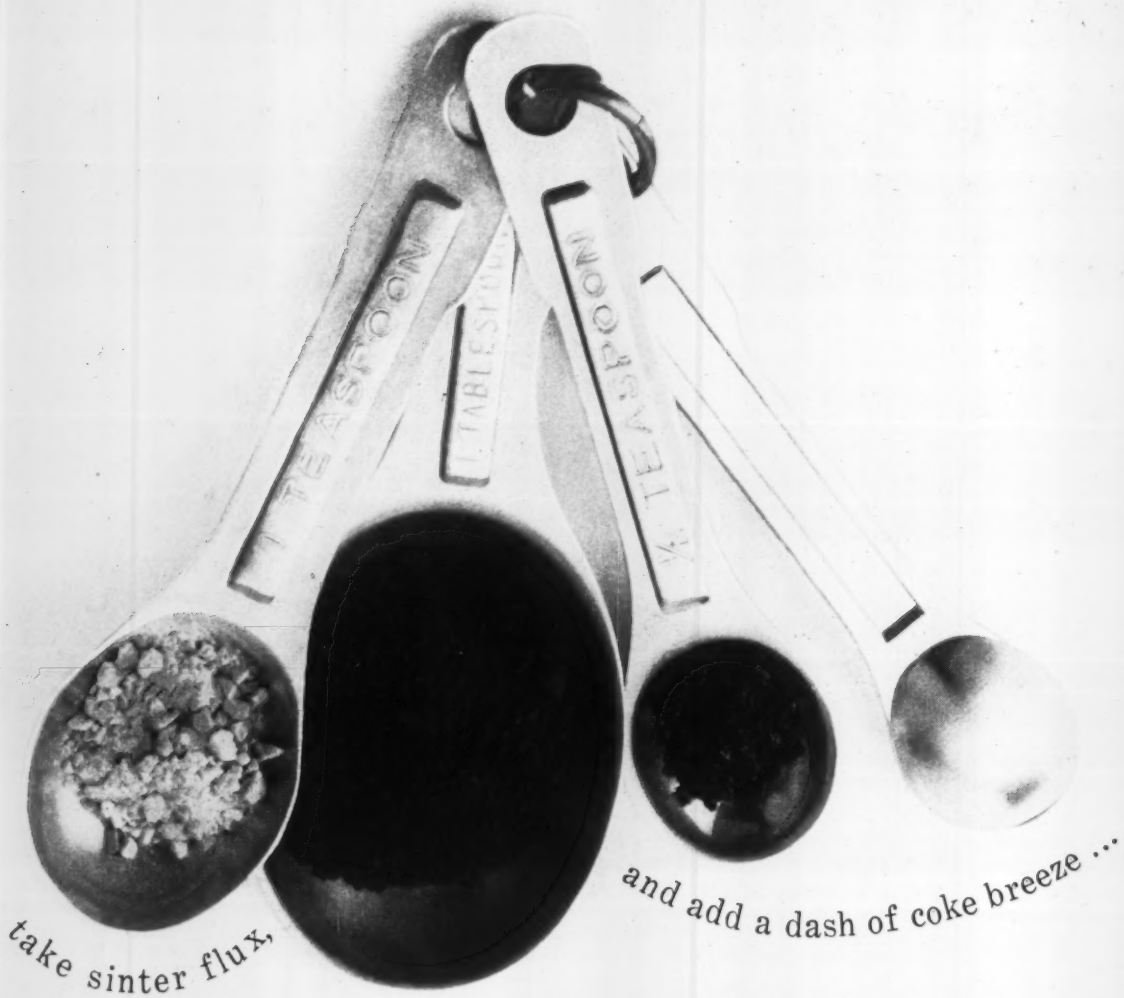
On the other side, steel industry representatives have an obligation to hold the line on the wage-price spiral.

So the elements for a deadlock on June 30 are present. It could last until after Labor Day.

That's nine weeks!

Irwin H. Such

EDITOR-IN-CHIEF



That's exactly what Inland's technical chefs will do when its giant, new sintering plant is completed in June. A single day's mix—4300 tons of iron ore particles, 500 tons of crushed limestone, 250 tons of fine coke—will bake a cake of clinkers which can be fed directly into blast furnaces. Result—better, faster reduction of raw iron ore to pig iron, blast furnace production upped 10%—*more and more Inland steel to feed the hungry production lines of fast-expanding Mid-America manufacturing!*

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PRODUCTIVITY...

Ways to Measure It

(Average annual rates (%) of increase, 1889-1953, for private domestic economy)

1. Net physical output per unweighted manhour	2.3
2. Net physical output per weighted manhour	2.0
3. Net physical output per unweighted unit of tangible capital	1.2
4. Net physical output per weighted unit of tangible capital	1.1
5. Net physical output per weighted unit of labor and tangible capital combined	1.7

Source: National Bureau of Economic Research.

Productivity, one of the most variously interpreted concepts in the economy, will be a key issue in coming steel wage talks. Its definition (or lack of agreement on one) could determine the course of negotiations

ONE MAN using a hand shovel can move 1 ton of sand in an hour. With a power shovel, he can move 10 tons in the same time.

Has his productivity increased ten times? Should he be paid ten times as much?

Yes, says the United Steelworkers of America.

No, say the steel companies.

That's the core of a controversy which will profoundly influence steel wage talks when they begin in New York. The union wants wage and benefit increases commensurate with what it calls productivity. Steel companies might go along with the argument that employment costs could go up as much as productivity and not cause inflation, but their definition of productivity is radically different from the union's.

How this debate is resolved will mean a lot to you—in the price you pay for steel and in pressures on your own employment costs.

The Figures

"Increases in productivity mean simply that unit labor requirements decline—that each ton of steel is produced with less hours of labor," says the steel union.

Management rejects the simple output-per-manhour definition of productivity with this argument:

The effect of output per manhour data is to hide all other inputs. Take the power shovel example. Such equipment is expensive, and the investor must be paid for the use of the additional money. What's more, the power shovel requires fuel, oil, grease, and maintenance by nonproduction workers. All those costs, as well as higher taxes, must be paid before there is any net productivity gain which can be competitively distributed.

Besides disputing the union's concept of productivity, the steel companies claim fallacies in USW's method of figuring output per manhour. The union uses the Bureau of

PRODUCTIVITY...

How Steel Management Sees It

Productivity is the quantity of goods and services produced—or output—compared with the contribution of men, machines, materials, money, and cost of government required by the process of production.

One of our knotty problems is the correct measurement of productivity. To get an accurate figure, all the inputs must be included. Also, because productivity varies from year to year, the only correct way to measure the gain is over a long period.

Dr. John W. Kendrick of George Washington University has developed what he calls total factor productivity (in "Basic Facts on Productivity Change," published by the National Bureau of Economic Research). It takes into account the contribution of men, machines, materials, money, and cost of government. He sees this annual rate of increase in the private domestic economy:

1940-48	**2.3 per cent**
1948-57	**2.3 per cent**

The American Iron & Steel Institute shows how these hourly employment costs in steel have increased annually:

1940-48	**8.0 per cent**
1948-57	**7.5 per cent**

Compared with national productivity gains of 2.3 per cent a year, steelworker employment costs per manhour worked advanced at a rate between 7.5 and 8 per cent.

What's more, the increase in employment costs per manhour worked since 1940 has been 288 per cent, or nearly ten times the 30 per cent gain in shipments per manhour worked.

Labor Statistics' figures on manhour production. With 1940 as 100, the 1958 index stands at 154.8. Steel management points out that the BLS calculation leaves out the growing number and proportion of nonproduction worker hours, and "substantially overstates the increase in output per manhour." Steel companies use an index of shipments per 1000 manhours worked. With 1940 as 100, the 1958 figure would be 130.1—a 30.1 per cent increase vs. the union's 54.8 per cent rise.

The Argument

Probably one of the understatements of the decade was made by Solomon Fabricant, director of research for National Bureau of Economic Research and New York University professor: "Despite its importance and the wide attention paid it, productivity is a subject surrounded by considerable confusion."

He and others at NBER have been trying to dispel the confusion with research on the matter. One of the others is Dr. John W. Kendrick of George Washington University. He has found dozens of ways to measure productivity; five common ones are shown on Page 47.

Dr. Kendrick has also developed one called total factor productivity which includes all the inputs. He finds that, for 1919-57, total factor productivity increased at an average annual rate of about 2.1 per cent. For 1948-57, the annual rate is 2.3 per cent. That contrasts with the typical union choice of 3.9 or 4 per cent per year. The union calculation results from:

1. Taking into account only one of the inputs (manhours).

2. Using the nonrepresentative base year of 1947, which exaggerates the average annual rate of increase.

3. Excluding the government sector of the economy.

Quite apart from any permanent growth over a period of time, in the short run, output per manhour will increase and decrease as the level of business increases and decreases. For example, the 1947-57 decade starts with the bottom of one of the most severe recurring dips of the output per manhour cycle since 1933 and ends near the top of one of the rises.

As a result, companies claim, the 4 per cent figure used by the unions as representing average annual increases in productivity is about the highest that can be computed.

Dr. Kendrick's findings indicate:

1. Average hourly labor compensation gained at a rate almost double that of the price paid for capital from 1919 to 1953.

2. From 1948 to 1957, the price of capital (the return to owners for the use of their capital—such as interest, net rents, royalties, and taxes) actually declined. The inflationary pressure tended to originate on the labor cost side, with mild restraint on the part of the monetary authorities in the latter part of the period resulting in a squeeze on profits. (The wage-push has been greater than the increase in productivity; it has forced up prices, even though the rate of return on capital has been falling.)

3. Labor has received a significantly larger share of the productivity addition to real income than

its share of total income at the beginning of the period.

At the Bargaining Table

So, each side is marshaling its statistics and its arguments on productivity in preparation for the May and June bargaining.

The productivity issue figured prominently in three preliminaries.

Late in March, President Eisenhower abandoned his customary hands-off role and urged that negotiations should not force an upward adjustment in prices. Earlier he said: "I have always urged that wage increases should be measured by an increase in productivity." The two sides responded: "We agree."

On Apr. 10, the 12 companies in the wage case (U. S. Steel, Bethlehem, Republic, Jones & Laughlin, Youngstown, Inland, Armco, Great Lakes, Colorado Fuel & Iron, Wheeling, Kaiser, and Allegheny Ludlum) proposed to the union that the present steel wages and other benefits be continued without change for a year. The proposal did not include provision for any adjustment for changes in the cost of living or in productivity.

Steelworker President David J. McDonald seized upon the exclusion as a major reason for rejecting the whole thing.

Productivity was high on the agenda at the union's executive board meeting Apr. 13 and 14 when it met to hammer out demands. The one made public: That "real wages" be protected with clauses providing for raises based on higher productivity. Other proposals: That steelmakers agree to a price freeze for the term of the new contract yet to be negotiated (this was a counterproposal to the companies' plea of Apr. 10 for an employment cost freeze and was also rejected). That talks begin May 4, not May 18 (companies says, "Ready now").

When negotiations begin, Mr. McDonald promises that union bargainers will have "a lot to say about productivity." They'll have a lot to say, too, on Apr. 30 and May 1 when USW's 170-man wage policy group convenes to rubber-stamp the demands decided upon last week.

Productivity was described in the Apr. 10 letter from the 12 steel companies as "one of the most widely misunderstood words in English."

PRODUCTIVITY...

How the United Steelworkers See It

The union figures productivity on the basis of output per manhour. Its argument: Those are the only firm figures available. The concept is widely held, even by the Department of Labor's Bureau of Labor Statistics.

Using that approach, the USW figures we have had a 3.1 per cent average annual productivity increase in steel since 1939. If you take 1947 as the starting point, the average gain is higher. Here's how it sees the improvement in output per manhour (basis, the prior year):

1959 (first half)	10 per cent*
1958	–1 per cent*
1957	0.1 per cent*
1956	4.7 per cent*
1955	11.2 per cent
1954	–2.6 per cent
1953	0.9 per cent
1952	4.0 per cent
1951	0.6 per cent
1950	9.1 per cent
1949	2.2 per cent
1948	0.2 per cent

*Estimated.

Real productivity gains in steel from 1939 through 1956 come to 68.8 per cent. But the increases in "real" straight time average hourly earnings in steel for the same period have been 47.1 per cent.

Should we drop the whole concept as unworkable and too subject to abuse? Listen to Prof. John Dunlop of Harvard:

"Productivity in America is in part a slogan. It is a good slogan for management. As the idea becomes widely accepted throughout the community, management is in a position to say people's wages should be increased when they produce more. Productivity is a good slogan for unions. It helps keep their eye on the market position of the company and upon the effects of working rules on output and costs. Productivity is also a good slogan for the members. It helps to keep before the rank and file of American workers the notion that there must be some relationship between what they get and what they produce. That is the essence of the notion of productivity."

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Kaiser Aluminum & Chemical Corp.

How Forging Sales Have Declined

(In tons)

1953	56,500
1954	37,000
1955	35,172
1956	37,833
1957	32,132
1958	25,350
1959	27,500*

*Estimated.
Source: Bureau of the Census.

Aluminum Forgings to Rebound as Costs Dip

MAKERS of aluminum forgings are tired of being an also-ran in the aluminum stable. They've decided to stop trotting and begin galloping to stay in the competitive scramble.

Example: Kaiser Aluminum & Chemical Corp. recently completed a $5 million expansion at its Erie, Pa., forging works. This is significant because demand is barely enough to keep the industry at a mere 20 per cent of capacity.

• **Scratched** — When the government cut back its manned aircraft program in favor of missiles, forgings took a setback. The market has trod a bumpy path since 1953—1958 shipments were only half of the record set that year (see table).

Missiles have taken up some of the slack. Most take generous amounts of aluminum forgings for surface and powerplant components. For example, Kaiser makes 13 different die forgings for the Nike Hercules. The forward and after fins for Sparrow III are forgings. But there isn't enough metal in a missile to fill up the void left by the decline in manned aircraft production.

• **Reappraisal**—This is why industry marketeers have shifted their sights to the commercial market as the future large tonnage user of forgings. Traditionally, civilian use has taken no more than 10 per cent of total consumption. Until recently, producers hadn't made much effort to promote forgings for industrial applications (unlike most other aluminum products).

Kaiser believes the civilian market is largely untapped. Says a spokesman: "Our market is limited only by our imagination. We are no longer just a mechanized blacksmith shop but an industry able to turn out a superior product at a competitive price."

• **Selling Points** — Here are the areas forging salesmen will stress in their efforts to woo users: The biggest advantage is the high strength to weight ratio—the best of any aluminum product.

Users can choose from a wide selection of alloys.

Parts can be forged to close tolerances (plus or minus 0.0001 in., says Kaiser). Fins for the Nike Hercules are held to 0.32 in. in thickness and 0.00003 in. in straightness.

Fewer machining and finishing operations are required. Forgings give a superior finish as delivered or for further finishing, such as anodizing.

• **Competitive**—Price is no longer a barrier, says Kaiser. It admits initial cost might be higher but emphasizes when machining and other finishing costs are figured, plus a lower rejection rate, forgings are competitive with other fabricated parts. Says one forging man: "Prices have been dropping at a rapid pace over the last five years. In some instances they're now selling at what you would pay for a quality sand casting."

At Kaiser's Erie plant a commercial forging weighing 1.75 lb is being produced for about $1.15 (65 cents a pound); another weighing some 14 lb for $8.50 (61 cents a pound); and a third weighing 7 lb for $4 (57 cents a pound).

Improved forging techniques and better equipment are credited with bringing forging prices into line with those of other products.

• **No Holds Barred**—Forging shops

won't be bashful about going after markets held by other aluminum products, especially castings. They'll also court users of malleable iron, and alloy steel castings and assembled parts.

Kaiser also believes aluminum forgings will capture some of the steel forging market. It claims aluminum eliminates most of the machining necessary with steel. It's not plagued with steel's scale problem.

• **Investment**—Kaiser thinks this potential is great enough to backstop its $5 million expansion which includes three new hydraulic presses with capacities of 3000, 5000, and 8000 tons and a central hydraulic accumulator station, powered by three 800 hp pumps.

• **Rocky Road Ahead**—Forging people admit they have quite a sales job to do before they can get any great penetration of the civilian market. Auto companies, for example, are beefing up castings instead of going into forgings. Interest in the forged piston remains an "on again, off again" proposition.

One breakthrough in the car market is the forged aluminum connecting rod for auto air conditioner compressors. It replaced a diecast rod.

Other civilian applications show promise. Kaiser is producing such items as switchgear parts and connectors for the electrical industry, clamp brackets for outboard motors, hardware items, textile industry parts.

Babies Mean Business

Expenditure of $1 million is planned by Aluminum Co. of America, Pittsburgh, to enlarge its Richmond, Ind., closure plant. It is the second expansion of the plant within a year, proving that babies mean business to metalworking.

The plant makes caps and seals for containers of infant food. A screw-on top, introduced last May, has enjoyed sensational acceptance. The jar cap not only can be quickly removed, officials say, but can be replaced with equal facility to again provide an airtight seal.

Aluminum Output to Soar by 1965

The future of aluminum as a basic industrial metal is tied to the markets classified below. The breakdowns are broad and inclusive: Transportation, for example, includes rail, highway, and marine transport, as well as automotive and aircraft applications. The figures represent the long term trend in such basic industries as food, shelter, transport, power distribution, communications, and national defense.

Aluminum Usage by Major U. S. Industries

(Millions of pounds)

INDUSTRY	1948	1952	1955	1958	Forecast 1965
Building	492	382	825	757	**1,557**
Electrical	214	347	445	468	**1,446**
Transportation	214	227	402	356	**1,302**
Consumer Durables	385	281	431	349	**856**
Containers & Packaging	43	91	190	227	**451**
Machinery & Equipment	214	171	227	194	**384**
Deoxidizing & Destructive	85	137	185	137	**225**
All Other Uses	363	233	717	644	**1,681**
Total commercial shipments	2,010	1,869	3,422	3,132	**7,902**
Defense	128	793	575	468	**500**
Total Industry Shipments (All Products)	2,138	2,662	3,997	3,600	**8,402**

Source: Kaiser Aluminum & Chemical Corp.

Motor Control Sales Hum

Manufacturers predict an 8 to 10 per cent upturn this year. Demand for engineered controls is on the rebound. Full recovery effects expected in the 1960s

INDUSTRIAL motor control manufacturers are predicting an 8 to 10 per cent sales increase for 1959. Some think sales will reach $450 million. That's quite a jump from last year's $365 million, but still under the $475 million recorded in 1957. A continuous, slow upturn has been evident since the low spot during 1958's second quarter. The Soaring Sixties are expected to show the full effects of recovery.

This year is witnessing the return of a "normal" product mix. In 1958, standard industrial control sales held firm. But there was a substantial decline in engineered products. Now, with capital goods expenditures rising, custom engineered controls are on the rebound.

"The sales boost will be generally across the board," says one general sales manager. The automotive and steel industries were pinpointed as big buyers. Nonferrous purchases are off since most of the industry's expansion programs have been completed.

• **Automation Grows** — The increased use of automated systems is continuing. Package deals (the purchase of a complete control system from one manufacturer) are coming on strong. Standard alternating current apparatus, generator control equipment, automated load transfer switches, and variable drive (adjusted voltage) devices were cited as selling well presently. Static control systems are becoming increasingly significant. Automatic distribution centers are also gaining wider acceptance.

The growth of electronic systems has been slow, but steady. Electronics makers are enthusiastic. One says: "Electronics are an unlimited field. We are in the pioneering stage. Industry is becoming electronics minded. We will hit our stride within ten years."

• **Forecast on Prices** — Prices are generally stable. Some price cutting on general industry controls caused a stir in the industry, but the situation has apparently settled. Larger industrial controls have kept on an even keel. A few smaller firms say they have been undercut by larger organizations which offer a complete controls and equipment line.

Prices are expected to rise slightly to compensate for increased costs and more extensive engineering.

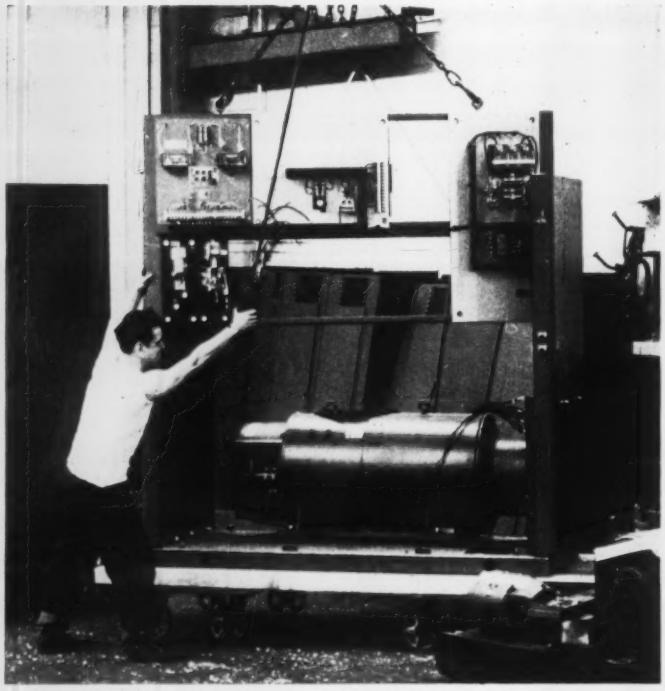
• **Education Needed** — Several of STEEL's survey respondents noted the need to educate consumers as to what is available. "This is especially true with electronic devices," comments a manufacturer. "Some people are afraid of electronic systems because they are not familiar with them."

A Wisconsin firm believes more thorough education of salesmen and engineers is necessary.

Other problems are typical of many industries. "Continuing upward pressure on costs in a period of depressed business is creating some difficulties," reports an administrator. A sales manager points out: "We are now given shorter leadtimes and must carry a larger inventory."

• **New Developments**—The importance of research and development programs is emphasized by several companies. Although many industry changes are evolutionary rather than revolutionary, a maker in the Midwest says: "Over 60 per cent of our business last year came from products developed in the last ten years."

Digital and logic systems, semiconductors, tracer drives, and numerical control devices are among recent technological developments expected to open new sales doors.



Control panels are lowered into a cabinet prior to the final assembly at Reliance Electric & Engineering Co., Cleveland

France Sets Output Marks

EACH OF France's basic industries set a production record in 1958. Although there was a slowdown in the growth rate toward the end of the year, the nation did not feel the recession experienced by some other European countries and the U. S. Total industrial output was up 6 per cent. Production has risen 55 per cent in the last six years, a larger increase than any other western country.

Steel production equaled 16.1 million tons, 3.7 per cent over 1957's. Rolled steel output was up 3.4 per cent to 11.7 million tons.

Iron miners extracted 65.4 million tons of ore, compared with 63.6 million tons in the previous year. Pig iron production rose to 13.2 million tons.

• **Auto Exports Up**—Auto, truck, and bus manufacturers rolled 1,127,754 units off their assembly lines, a 22 per cent boost. Passenger cars accounted for 924,231 vehicles, of which 358,785 were sold abroad (a 42.5 per cent increase).

Coal miners turned out more than 66 million tons of coal. Of that, hard coal registered 62.9 million tons (up 1.7 per cent from 1957).

Crude oil production totaled 16.8 million barrels, up 1.8 per cent from 1957. Crude oil processing reached 208 million barrels of refined crude (up 19 per cent). Refining capacity was enlarged to 275 million barrels.

Natural gas output nearly doubled, recording 38 billion cu ft.

Electric power charged up 61.8 billion kwh, a 7.1 per cent increase and triple the prewar mark.

Sign of the public's personal participation in the fruits of their labor: In the last decade, French auto registrations have risen an average of 350,000 per year. The nation is now the most motorized country in Europe.

British Hit U. S. on Trade

INCREASED CONCERN and even bitterness is mounting in Great Britain regarding "unscrupulous and unprincipled business tactics of Americans, sometimes connived at by Washington, at a time when Britain has liberalized her trade at the behest of America." This blast came from E. E. Bullus, member of Parliament.

It was the second charge fired at Anglo-American trade relations by the English in the last few weeks.

Sir David Eccles, Board of Trade president, said earlier: "If the Free World is to survive, our co-operation in economic policy is as necessary as that in defense."

He cited "recent actions by the U. S. which are reducing the sense of economic co-operation between my country and the Commonwealth and our great ally."

• **Not Justified**—Sir David referred first to quotas on lead and zinc "designed to protect high cost production in the U. S." He spoke of the Greers Ferry contract in which an American bid was accepted over an English bid which was 17 per cent less. "Nobody in this country believes that the rejection of British tender was justified on defense grounds."

Of current concern is the opposition developing in the U. S. against confirmation of a large turbogenerator order obtained from TVA by C. A. Parsons & Co. Ltd., Newcastle upon Tyne. The bid was 50 per cent under the nearest U. S. competitor.

New Steel Plant in Canada

FIRST COMMERCIAL USE of the Strategic-Udy steelmaking process will be made by a recently formed Canadian firm.

Quebec South Shore Steel Corp., Montreal, will build a $12 million plant at Varennes, Que., for the direct reduction of iron ore to pig iron and semisteel. Annual capacity will be about 140,000 net tons; employment will be about 150. Ground will be broken in late June at a 200 acre site on the south shore of the St. Lawrence. Completion is scheduled for early 1961.

• **Re-Bar Capacity** — Robert Lafleur, president, told STEEL that his plans include construction of a reinforcing bar mill. "Surveys have shown that Montreal and the province can absorb about 125,000 tons of reinforcing bars a year," he declared. "At present, they're coming in from the U. S. and from neighboring provinces. We expect to produce at least 60,000 tons annually."

Koppers of Canada Ltd., a wholly owned subsidiary of Koppers Co. Inc., Pittsburgh, will design and build the plant and manage production during the break-in period. Koppers has been working on commercial applications of the Strategic-Udy process for 18 months with the firm that developed it, Strategic Materials Corp., Niagara Falls, Ont.

• **Ore in Abundance** — Ore will come from the nearby properties of Hull Iron Mines Ltd., a company whose assets are being purchased outright. Iron content is about 48 per cent. "We know we can use it economically," says Mr. Lafleur, "because we shipped 400 tons to Strategic Materials for testing before we made our decision." Hull has been granted a new concession in the Big Three Lake claim group at Mt. Reed, Que., where reserves are estimated at 15 million to 24 million tons.

"We're impressed by the flexibility of the process, and we're well equipped to use it, since we have plenty of ore and power at reasonable prices," Mr. Lafleur concludes.

How to Fight Plant Fire and Theft

AN INVENTORY check revealed that an auto company was missing $20,000 worth of sparkplugs at an engine assembly plant.

Its plant security force took ten days to solve the case (it won't reveal how) and secure evidence to convict a ring of thieves.

The incident points up a warning voiced by John H. Heyrman, Pinkerton's assistant director of security service: "American industry should put its house in order in terms of physical security and plant protection or it may find itself facing a crisis it cannot meet without damaging losses."

Liberty Mutual Insurance Co., Boston, breaks down over-all losses (including those in manufacturing) this way: It claims that losses traced to employee dishonesty amount to $500 million a year; forged checks cost business another $300 million; burglaries (more than 1000 a day) cost $100 million, and fire losses account for $1 billion annually.

Such expenses can't be eliminated, but experts claim that even minimum protection of plant and personnel can reduce them.

• Plan protection takes two basic forms: Mechanical (usually fire and burglar alarms) and human (plant guards). Minimum security for any plant is a fence.

If you have a few well placed hand extinguishers in your plant, you have the minimum fire protection. Chances are you need a better system and that you can get it at less cost than you think. Many safety experts feel that minimum fire protection is afforded by a sprinkler system. They are usually engineered for your needs and to give you the best break on your insurance rates. One manufacturer claims that its systems can be paid for in six to ten years from savings in fire insurance rates alone.

Sprinkler systems fall into two basic types: Fixed temperature and rate of temperature rise. Each type can be installed with either a wet

or dry pipe system to match the climate of your area. Most sprinkler systems include an alarm which sounds when the sprinklers are set off.

Protection is increased when such systems are tied in with a centralized communications center. Some large plants which maintain their own safety forces have a control station in which a signal board shows the point of trouble. But smaller plants find it more economical to use a system similar to ADT (a service of the American District Telegraph Co.). When a sprinkler is set off, an alarm sounds in the ADT central office and an investigator is immediately dispatched to the plant.

Maximum fire protection can be obtained with only a trained fire brigade. In some larger plants, it is a full-time force similar to the community fire department. In smaller plants, a volunteer force can be recruited from the production workers. After it completes basic training in fire fighting techniques, it supplements the sprinkler and alarm systems.

Point to remember: Regardless of which system you use, all equipment should be inspected periodically, and personnel should be given regular fire alarm practice to maintain maximum readiness.

• You should also have plant guards.

Such a force has no set patterns. You can get by with as few as two men (one for day and one for night duty). At the other extreme, GM employs 4700. Their assignments run from gate duty to cloak and dagger investigations. Their most common tasks are:

1. Gate duty: To guide and check incoming and outgoing traffic.
2. Visitor control: To make sure that all persons entering the plant area are authorized, and to see that they are directed to the persons they want to see.
3. Fire control: To make periodic checks throughout the plant for fire and other hazardous conditions.
4. Personnel control: To check employees in and out of the plant and make routine examination of packages for unlawful removal of company property.
5. Applicant investigation: To make sure that company hires only desirable personnel.
6. Patrol duty: To make periodic checks of the plant and property to guard against unlawful entry and damage to equipment and buildings.

You have three ways to recruit a force: Choosing workers from your own production force, hiring men solely for guard duty, and contracting with one of the well known detective agencies.

Most plant protection experts feel that it is unwise from both the security and economical viewpoint to take your own workers from the production line. Too often, plant protection becomes a graveyard for semi-retired workers or the physically unfit.

Experts feel such guards are often too trusting of "old buddies" from the plant. But the guards claim that friendship gives them an "in." One chief who came from the production line says his job is made easier because his many friends tip him off when a dishonest worker

tries to get away with something.

This type force is usually the most expensive. Because of his long-time service to the company, the "old timer" usually commands higher pay than a younger man hired directly for guard duty.

A large firm which hires its guard force from outside the plant claims it has more complete control over quality. Successful applicants must pass rigid age, physical, and personality tests. ("Personality is important because our guards are the first representatives of our company which the visitor sees when he gets here and the last he sees when he leaves. Our guards are really an arm of the public relations department," observes the personnel director.)

The private detective agencies claim that they can give you more professional plant protection for less than it costs to maintain your own force. (A fastener manufacturer who switched from his own force to the William J. Burns International Detective Agency Inc. is saving 20 per cent.)

The agencies will come into your plant, make a survey of your needs, and tailor the force to fit them. They relieve you of the expense of training the men, supplying uniforms and other equipment, and paying fringe benefits. You pay a flat fee for a specified number of hours of protection. Regardless of the circumstances, the guards are obligated to protect the plant and personnel as the plant management sees fit.

• **Regardless of the size of your plant or the product you make, you need some form of plant protection.**

The losses you suffer from such minor items as tool pilferage or damaged equipment may seem like a drip from the cost faucet, but added up they can spell real financial trouble. One of the systems described here may be the answer to your problem.

Foundrymen Hold Congress

New president of the American Foundrymen's Society is Charles E. Nelson, technical director, Magnesium Div., Dow Chemical Co., Midland, Mich. He succeeds Lewis H. Durdin, president, Dixie Bronze Co., Birmingham.

Norman J. Dunbeck, vice president, Industrial Minerals Div., International Minerals & Chemical Corp., Skokie, Ill., was chosen vice president.

The society also honored several members with awards at its 63rd Castings Congress in Chicago last week:

Harold W. Lownie Jr., chief of process metallurgy division, Battele Memorial Institute, Columbus, Ohio (John H. Whiting Gold Medal for "contributions in the field of gray iron").

John A. Rassenfoss, manager, manufacturing research laboratory, American Steel Foundries, East Chicago, Ind. (Peter L. Simpson Gold Medal for "elevating technical endeavor in steel foundry research").

Fred J. Walls, vice president, research and development, Engineering Castings Inc., Marshall, Mich. (John A. Penton Gold Medal for "contributions to gray iron metallugy").

Foresee Best Cooler Sales

Room air conditioner manufacturers are pointing for a record year in retail unit sales; estimates run from 1.6 million to 1.75 million units, compared with last year's estimated 1.35 million.

A unified sales campaign is being opened by 13 room conditioner manufacturers in the room air conditioner section of the National Electrical Manufacturers Association. Heading the section is Joseph B. Ogden, vice president of Airtemp Div., Chrysler Corp., Dayton, Ohio.

He thinks two factors favor a record year: Heavier shipments to distributors and dealers since late last year, plus the prospect of a spring buying rush before an Internal Revenue Service ruling adds a 10 per cent excise tax to manufacturers' sales.

Butler Enlarges Facilities

A $700,000 improvement program at the Birmingham plant of Butler Mfg. Co., Kansas City, Mo., is nearing completion. Equipment has been installed in the Steel Building Div. to manufacture heavier, wide-span buildings for commercial and industrial use. More plate shearing capacity and automatic welding equipment have been added to the plate shop.

In Detroit, some unusual methods are used to safeguard new model secrets. At Ford Motor Co.'s Styling Center, trained guards man 60-power telescopes atop the building to detect any prying eyes in the surrounding area. All authorized personnel must wear badges which include their pictures. All locks in the center are assembled within the building and can be changed within an hour. All keys are cut by the security force

Can Congress Control State Taxing?

KEEP YOUR eye on Sen. John Sparkman's (D., Ala.) Small Business Committee for recommendations to modify the power of states to tax corporations. The presence of L. E. Kust, Westinghouse Electric Corp.'s general tax counsel, at recent hearings of the committee indicates the senator's recommendations will not be limited to small companies.

The hearings grew out of the Supreme Court's decision (Feb. 24) to give a state the right to tax income of corporations marketing products in that state but not maintaining manufacturing, warehouse, or general office facilities there. Two principal cases: Northwestern States Portland Cement Co. has five salesmen and a secretary in Minnesota; Stockham Valves & Fittings Inc.'s sales representative spends one-third of his time in Georgia. The Supreme Court ruled Minnesota and Georgia may levy income taxes on the two firms with these restrictions: 1. The tax must be fairly apportioned to the firms' activities in the state. 2. A minimum nexus or bond must exist between the state and the corporation, possibly in the form of permanent representatives. (It is doubtful that the court's ruling applies to mail order business, suggests John Dane Jr. of the U. S. Chamber of Commerce.)

Other States to Follow Court's Lead

It doesn't take a Washington lawyer to see the possibilities in this decision: Mr. Kust thinks "the courts will be flooded" as a result. Senator Sparkman believes every case may have to be decided on its own facts. Clarence Turner, representing the Pennsylvania Chamber of Commerce, said:

"Most states not having such taxes will get on the bandwagon."

Mr. Dane warns: "If any substantial number of states follow the footsteps of Georgia and Minnesota, the economic implications may be substantial and unfortunate." He thinks smaller companies would tend to restrict operations to their home state, leaving the field of national sales to larger, well established firms in a better position to absorb the taxes and the cost of compliance with various tax laws.

Compliance Costs Grow

Mr. Kust reports Westinghouse spends $170,000 a year determining the amount of taxes it must pay to 34 states, 10 cities, and the District of Columbia. State and local taxes run from $2 million to $3 million a year. So the cost of compliance amounts to about 7 per cent of the taxes the corporation pays. He believes the percentage is higher for firms smaller than Westinghouse. Clearly, it is excessive.

Sparkman Hopes for State Co-operation

A top constitutional lawyer has advised the committee that Congress has the power to set up a uniform code for state taxation of corporations, which would cut the cost of compliance and eliminate the possibility of double taxation. He believes the power stems from the Congressional right to regulate commerce. But he does not recommend such action.

Senator Sparkman hopes bordering states can work out compacts to adopt similar taxing codes. "States' rights" cries are feared if the federal government acts.

Dr. Harold Groves, public administration expert from the University of Wisconsin, suggests the states will not be able to rely upon the Supreme Court to clean up "this Alice in Wonderland area of constitutional law" because the court's personality changes over the years. It rules only on cases, and its decisions tend to be a negative, rather than a positive development of code. He doesn't think the court would sustain a federal code, if passed by Congress. "A federal agency," he says, "may be the best tool for prodding the states into co-operative action."

The moans of discontent have already started to affect Capitol Hill. New York would lose $20 million in tax revenue, says one source, if one type of co-operative formula were adopted. Crux: Business will do well to work out a positive approach before the politicians and courts confuse the issue any more.

State Fights Fluorspar Bill

As usual, domestic miners are getting no help from the State Department. Thomas Mann, assistant secretary of state for economic affairs, has told the Senate Minerals Subcommittee it is "strongly opposed" to S. 1285, a bill establishing quotas on fluorspar imports. The Office of Civil & Defense Mobilization is investigating (under Section 8 of the Trade Act) the harm imports are doing to national security. The State Department prefers this approach, or an appeal by the industry to the Tariff Commission.

Atlantic Steel Wins Case

The courts have ruled the Tariff Commission must investigate imports of barbed wire. Atlantic Steel Co. sued the commission after it refused to investigate the damage imports were doing to domestic producers on the ground that Congress should act first. The Tariff Commission may appeal.

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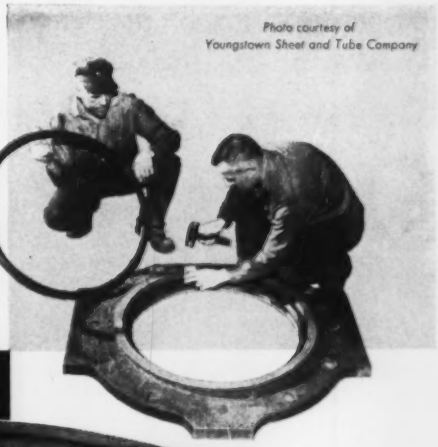
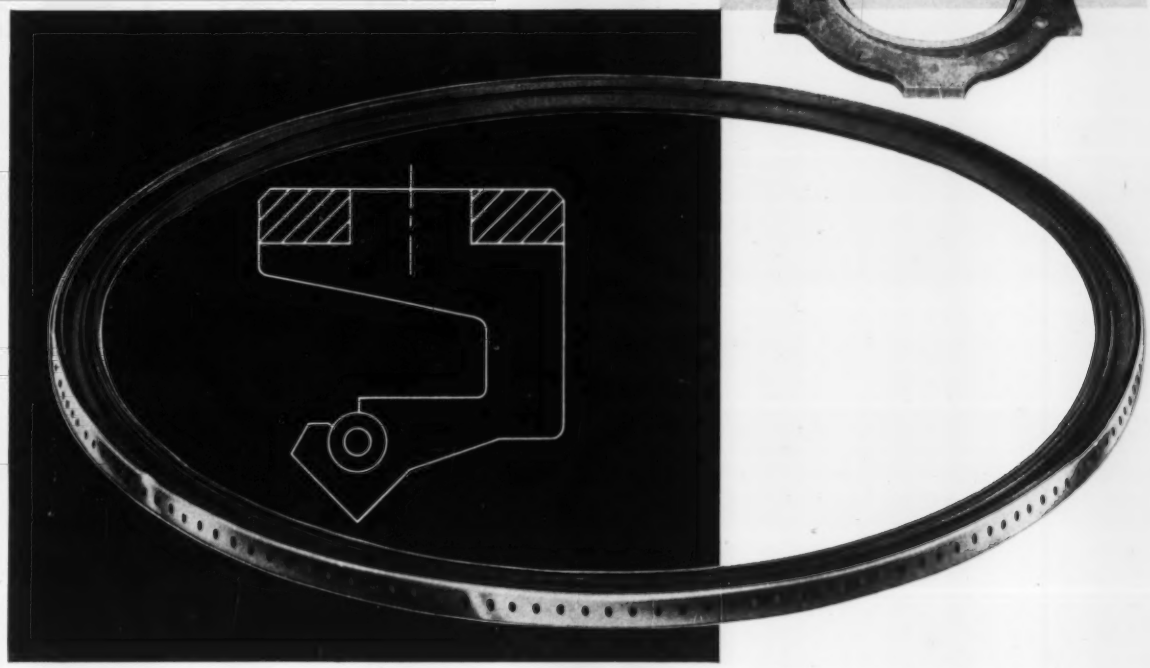


Photo courtesy of Youngstown Sheet and Tube Company



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Pipeline Business Is Better but Still Below Expectation

Gas transmission companies have been slow in responding to favorable high court decision in Memphis case last December.

Value of applications to Federal Power Commission for new constructions:

3 months before ruling . . . . $390 million
(Sept., Oct., Nov., 1958)

3 months after ruling . . . . . $191 million
(Jan., Feb., March, 1959)

REVERSAL of the so-called Memphis decision last Dec. 8 improved the climate for gas pipeline expansion, but it didn't release a flood of applications to the Federal Power Commission.

The FPC got more new business in the three months before the reversal than it received in the four months (including December) that followed. December was a big month, but FPC officials think the applications they received, $188 million worth, would have been submitted even if the Supreme Court hadn't acted. It takes months to put together a major application.

Oddly enough, the value of projects submitted in this year's first quarter was also below that of the projects submitted in the first quarter of 1958. If comparison of the figures proves anything, it's this: Impact of the Memphis reversal hasn't been felt yet.

• **How Reversal Helped**—By overturning a lower court's decision of November, 1957 (that gas transmission companies couldn't apply to the FPC for higher rates without first obtaining the consent of all their customers), the Supreme Court affirmed the government's long time policy: Pipeline operators can put rate boosts into effect, subject to refund, while awaiting FPC approval. All they have to do is give their customers six months' notice.

How much business has been opened up by the Supreme Court's ruling? Perhaps $500 million. Most of it's in the planning stage, and the preliminaries (negotiating loans, obtaining gas supplies, procuring pipe, and acquiring rights of way) require at least six months. By one estimate, about 200 projects were held up by the Memphis dispute.

• **Bright Future**—Because of unsettled conditions in the industry, 1958 spending for transmission, distribution, and storage facilities fell about $100 million short of the American Gas Association's $1.8 billion forecast. This year, spending will probably top the AGA's estimate (made a year ago) by $300 million. AGA now predicts at least $2 billion for 1959 and says there's a chance that spending will hit $2.2 billion. President J. T. Wolfe foresees record expenditures of at least $8.1 billion in the four year period through 1961 (vs. $5.7 billion spent in 1954-57 and $5.1 billion in the previous four years).

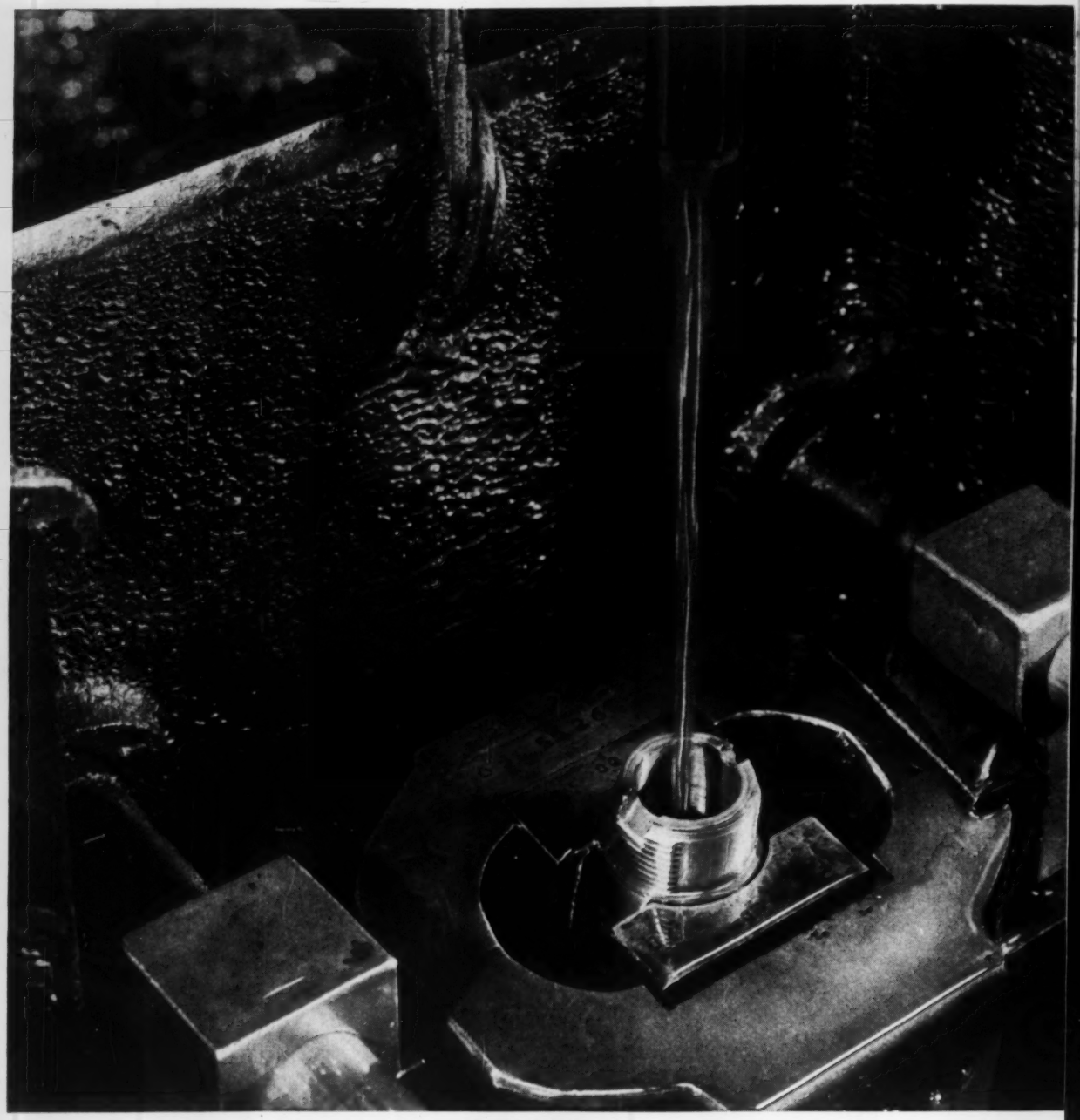
• **Line Pipe Surge**—Most line pipe producers are sold out for the first half, and many expect capacity operations for the balance of the year. FPC officials look for a 50 per cent jump in pipeline construction from last year's 6800 miles to 10,000.

Transwestern Pipeline Co. recently ordered 300,000 tons of pipe for a line running from West Texas to California. Although FPC hasn't approved the project, the promoters borrowed $75 million and firmed up their pipe orders for first half delivery.

Tennessee Gas Transmission Co. ordered 100,000 tons for a line from Portland, Tenn., to Chicago. It's a risky game the pipeline operators are playing; buying without FPC sanction could prejudice their chances of approval, but the stakes are high.

• **Valves, Compressors Gain**—"The Memphis reversal did release some work for 1959," says the chief sales executive of a firm that makes compressors. "Our first quarter was considerably better than the corresponding period in 1958. For the year as a whole, we expect a 15 per cent improvement in sales and shipments." Valvemakers look for a 10 to 15 per cent rise in shipments this year and a marked increase in sales to utilities by late '60 or early '61.

• **Delays Explained**—FPC officials admit that they haven't disposed of many cases since the Memphis reversal but protest that they're understaffed. The time required to process a case depends on how controversial it is. Some applications are approved in two months, others in two years. Average time: Eight months. Commissioners must decide: 1. If there's a need for the pipeline. 2. If the applicant has a 20 year gas supply. 3. If he's adequately financed. 4. If opponents (other pipelines, coal interests) have valid arguments against his project. 5. If proposed rates would be fair to consumers. The commission had an application backlog of $1.53 billion in March of this year; the backlog in March a year ago was $1.32 billion worth.



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Ithaca Gun Company, Inc., of Ithaca, N. Y., makes the famous Model 37 Featherlight Repeater, Model 37 Rib Grade Repeater and Model 37R DeLuxe Repeater . . . all shotguns to warm the heart of any hunter.

Special steel barrels for these guns are reamed on a 12-spindle machine designed and built by Ithaca Gun engineers. Each gun barrel passes through three borings of different sizes before the proper size choke is achieved. Chokes from .410 gauge to 10 gauge are obtained on this machine, which can bore 80 barrels per hour.

Says A. G. Stevens, Plant Superintendent: "Our gun barrels are reamed to very close tolerances, and they must have a silk-smooth finish. When you're doing precision work like this, cutting oils play a mighty impor-

Shotgun barrel boring machine, designed and built by Ithaca Gun engineers, has 12 spindles on each side. Machine can bore 80 barrels per hour with both sides running.

A. G. Stevens, Plant Superintendent, inspects a Model 37 Featherlight Repeater. Gulfcut cutting oil helps Ithaca Gun maintain the close tolerances essential for accurate-firearms.

Gun barrel is pushed up onto stationary reamer of special boring machine. Gulfcut 11A pours continuously over the boring area and is re-circulated through a filter system.

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SM-0129

Ten Year Plan Pays Off for Capital Goodsmaker

Cooper-Bessemer's Basic Approach:

PRODUCTS:

It puts emphasis on "evolutionary" products which can be engineered, built, sold with present organization.

MARKETS:

It puts emphasis on earning stability offered by markets and products with different demand cycles. New markets must offer growth.

MERGERS:

It puts emphasis on combinations which offer products for growth markets already served.

FACILITIES:

It puts emphasis on locating manufacturing facilities closer to major markets—in the Southwest and Canada.

PEOPLE:

It puts emphasis on effective organization, incentives, to produce the best efforts from people, believes young talent is attracted by opportunity.

Sales Are on the Rebound:

(In millions)

	GOALS	PERFORMANCE
1957	$63.0	$69.241
1958	67.7	52.5
1959	71.8	(FORECAST) 62.0
1960	76.0	—
1966	110.0	—

COOPER-BESSEMER CORP., Mt. Vernon, Ohio, is one capital goods maker predicting a near record year in 1959.

The company is a producer of gas engines and compressors. Shipments totaled $52.6 million in 1958 (down from 1957's $69.6 million); it expects to bounce back to around $62 million this year.

• More products, markets, plants, and greater productivity are counted on to do the trick.

Cooper - Bessemer's 40 - year - old president, Eugene L. Miller, feels that the key to growth is in "organizing more effectively to do the job we have to get done." But, along with organization efforts, the firm will introduce at least five new major items of equipment; open a new engineering and production plant, and will invade new markets by trying to outdesign competitors.

• New Products: Keeping pace with changing needs.

Equipment debuts this year will include a new model high horsepower engine to operate pickup, (wellhead) gas compressors. As gas usage depletes well pressures and demand warrants drilling heretofore marginal gas pockets, the need for bigger compressors opens a new market. C-B has already made its first sales of the new unit.

Also, the firm will introduce two new smaller capacity compressors for the $18 million market in the 150 to 350 hp range.

• C-B has had the happy experience of seeing one market foray open greater opportunities.

A string of related product improvements, running back to 1948, has led Cooper-Bessemer from one market to another. The company decided to desert outside suppliers and develop and build its own turbochargers. This integrating step, with resulting closer control over product, enabled the firm to step up engine horsepower by as much as 50 per cent.

More powerful engines encouraged the firm to start producing centrifugal compressors in 1956, as well as the reciprocating type. In 1957, a new, $2.5 million plant was opened for building multistage centrifugals. Then, C-B started shopping around in the refinery markets, where the preference is for rotating machinery which can be hooked up to motors and turbines for direct power transfer. Now, the company has started production of large blowers for use in catalytic cracking facilities and its sales representatives are carrying the word to the major oil companies. A profitable side effect of the centrifugal development has taken C-B's blowers into municipal sewage aeration; such units are now in use in Washington.

Following World War II, Cooper-Bessemer found the market for power generator engines disappearing. As central power stations utilized larger, more efficient boilers to reduce their capital investment per kilowatt hour, applica-

tions for engines lost out. Following the adage, "If we can't lick them, we'll join them," C-B decided to develop a line of soot blowers for coal or oil burning boilers. Here again, the response has justified introducing another new type of compressor this year.

Observing that the early missile industry was heavily dependent on liquid fuels and liquid oxygen, C-B charged into previously uncharted production territory and came up with a complete line of oxygen handling support equipment. It built a 10,000 horsepower motor-driven compressor; designed and built an expansion engine, the two essentials for liquid oxygen making. C-B equipment can be found at all the major missile bases.

The birth of oxygen steelmaking provided another opportunity when rocketry started turning to solid fuels. The missile support equipment can be put to work in the oxygen steel industry. "We have used the missile program as a vehicle to get ready for what we regard as a much larger commercial market," says Mr. Miller.

• **Plant facilities will pool know-how to serve widely separated markets.**

The widening market for small pickup gas compressors, to be produced as "packaged" or complete compressor plants, has prompted C-B to open production shops in the Southwest. C-B Southern Inc., an engineering and manufacturing subsidiary in Houston, opens its doors this month.

With the same potentials opening up in Canada, another subsidiary will turn out the package compressors at Calgary, Alta., working on technical assistance from the Houston office.

• **C-B is still running the old store.**

Along with its exciting new business opportunities, Cooper-Bessemer cannot ignore the smaller, but steady, requirements of older markets. It will continue to produce equipment for the relatively minor business in locomotive engines, marine engines; will serve a renewed market in replacing obsolete gas transmission equipment.

Last year's dip knocked C-B off its trend line, established in a ten year plan of 1956. Undaunted, the company expects to get back on the beam by 1960. It will need sales that year of $76 million to do it. Exuding confidence, the company is drawing up the next ten year schedule, to start in 1967.

Cooper-Bessemer: 1959 Markets

Market	% of total
Gas transmission	36.4
Customer repairs	23.0
Gas & oil industry	14.8
Industrial, other	11.5
Chemical industry	6.0
Marine	4.5
Railroad	4.0

Does not add to 100 due to rounding

GE Designs New Turbine

New combustion gas turbines for electric power generation during short term peak loads are being offered by General Electric Co.

They are designed to burn either natural gas or distillate oils. Savings stem from quick starting and stopping. Charles W. Elston, general manager of GE's Gas Turbine Dept., says electricity suppliers can predict peak load periods and the amount and duration of the extra load.

"Just 20 minutes before the peak demand is expected, the gas turbine can be remotely started, and when the demand surge occurs, the peaking unit can supply the additional power to the system," he says. The starting and stopping procedure for a standard steam turbine plant may run as long as 12 hours for as little as 2 hours of power generation.

Location is simplified because the turbines are small and have limited water requirements. Their limited operating periods will mean reduced maintenance costs. They are rated at 20,500 kw.

Mississippi Steel Is State's First Mill

STEELMAKING is nudging King Cotton's crown in Mississippi's economy. The state's first steel company, Mississippi Steel Corp., is producing 3000 tons of concrete reinforcing bars per month at its mill near Jackson.

The company was organized in September, 1956, with W. A. Caldwell Sr. as chairman and Walter H. Stewart, one of the stalwarts in the reinforcing bar industry, as president. Mr. Stewart came out of retirement to oversee construction of the $1,750,000 plant. He had been in sales and engineering with Republic Steel Corp. and a vice president with Virginia Steel Co. Inc.

Only four of the 100 employees had experience in the steel business and most of the others had never seen a steel mill before going to work for Mississippi.

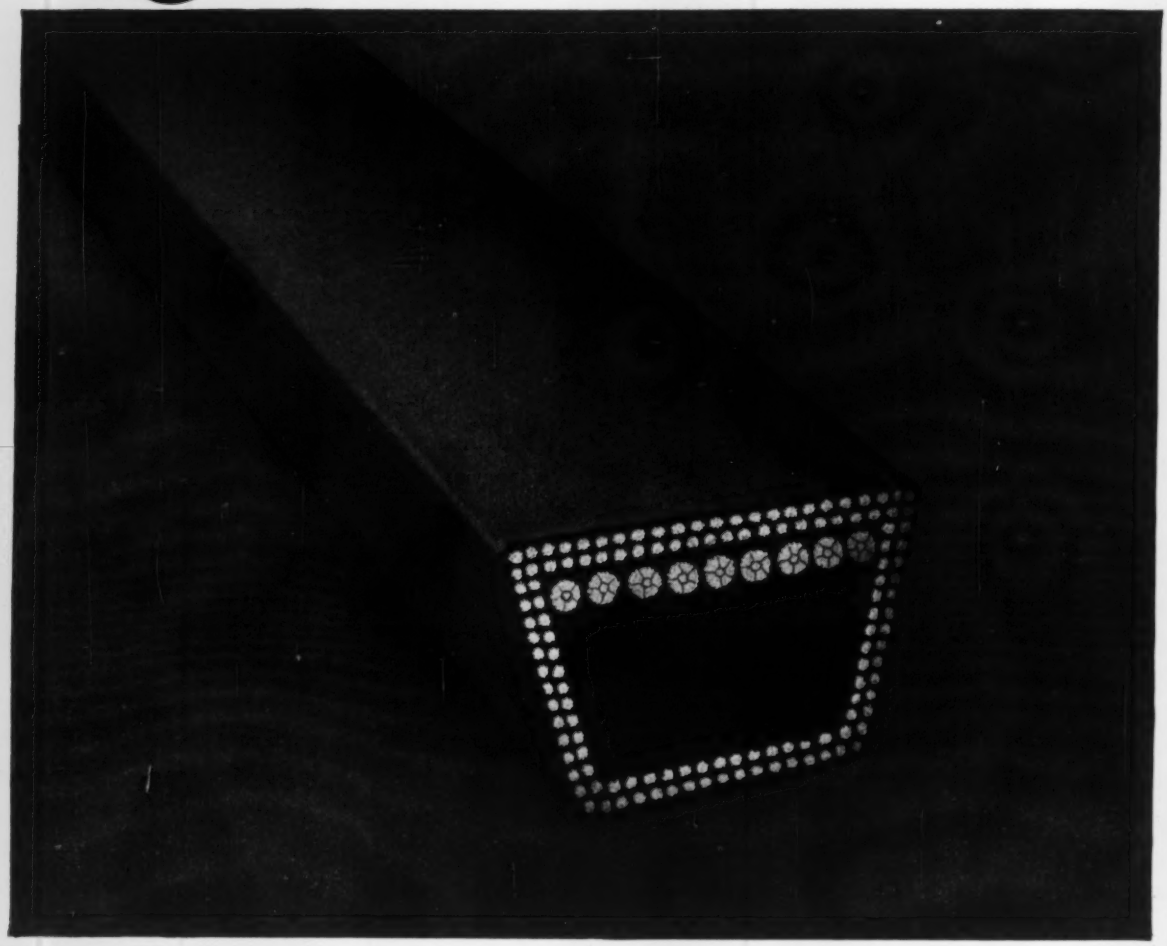
• **Quick Start**—But, in less than a year, the mill was turning out finished bars for construction projects in Mississippi, Louisiana, and Arkansas. About half of the output goes directly to construction jobs and the other half is sold to steel fabricators for further processing. The company plans to add merchant bars and bar-size angles to its line of No. 4 through 11 reinforcing bars. Big project: The mill turned out reinforcing bars for the construction of foundations in the $25 million turbine generator plant of the Mississippi Power & Light Co., in Jackson.

• **Equipment**—The company has capacity for producing 45,000 tons of electric furnace steel annually and its electric arc furnace has a rated capacity of 10 net tons per heat. It also has a continuous heating furnace with a 100,000 ton annual capacity.

Other equipment: A 16 in. bar mill (3 high, one stand); a 12 in. bar mill (3 high, four stand); and a 12 in. bar mill (2 high, one stand).

Total rolling capacity is estimated at 115,000 net tons annually.

ROYAL F. H. P. V-BELTS



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Stainless, Zinc Hold Trim Market

Aluminum's biggest market is in functional parts. Per car use of three competitive metals is increasing.

Average Car Use
(In pounds)

	1959*	1958	1957
Stainless	42.6	37.2	36.0
Zinc	77.5	73.0	70.9
Aluminum	57.0	53.0	43.5

*Projected. From Stainless Steel Producers Committee of AISI, American Zinc Institute, and Reynolds Metals Co. Based on total automotive consumption.

ALUMINUM is getting a more searching look from carbuilders. It took the industry a long time to accept the metal, but ever since it made the grade, designers have wanted to try it for everything. Inevitably, they've found that the tried and true materials still work best for many applications. This doesn't mean aluminum is on the decline in the auto world. With the advent of aluminum engines and major castings, its use in functional parts is expected to grow rapidly.

But as the table above shows, stainless steel and zinc are more than holding their own, particularly for decorative parts. Of the stainless on a car, 85 per cent is used in brightwork, says the Stainless Steel Producers Committee of the American Iron & Steel Institute. The American Zinc Institute reports 82 per cent of its per car consumption goes for parts that fall into the trim or functional trim categories. Only 20 per cent of the aluminum in a car is trim.

• **Define It** — The line between what it trim and what is functional is hard to draw. AZI says that of the zinc diecastings used on 1959 cars, 12 per cent are for purely decorative applications. Another 18 per cent are for functional parts like fuel pumps, instrument components, locks, and latches. The remaining 70 per cent fall into the half 'n' half group, including such items as door and window handles, rear view mirror assemblies, and instrument cluster housings.

• **Defend It**—To overcome some of the initial rushes made by the aluminum industry, zinc and stainless producers are helping automen develop better processing methods. Their efforts seem to be paying off.

C. O. Durbin, project engineer in charge of Chrysler Corp.'s corrosion laboratory, says that although the use of anodized aluminum for trim has been increasing, it is not expected that stainless steel will be reduced or replaced. Stainless trim dropped from 25 lb per car in 1956 to 18 lb last year. But on this year's models, its use has increased to 29 lb.

Richard E. Paret of the stainless steel committee believes the biggest trend is to more functional use of stainless. Its corrosion and dent resistance plus high tensile strength make it a natural for items like belt moldings and wheel covers.

The committee predicts stainless use will double by 1967.

• **Reduce Its Cost**—Zincmen have been equally conscientious in developing cost saving methods and finishing techniques. Better die polishing setups are cutting finishing costs.

Improved plating processes aid corrosion resistance.

Partially as a result of zincmen's efforts, it appears the Society of Automotive Engineers will revise its standards next year, so there will be only a dozen or so plating specifications instead of the 70 SAE standards now in use. This could result in sizeable reductions in the finished cost of plated zinc diecast parts. Suppliers would be able to turn out parts for several companies without installing extra equipment to meet different specs. Equipment makers could also standardize plating units.

Zinc has two advantages auto engineers keep in mind when costing out parts. First, zinc diecast surfaces "smear" easily when buffed, making a better plated surface. Second, the industry has substantial capital investments in zinc plating and finishing equipment If it's already amortized, companies have a head start in working finished costs down. This is reportedly one of the reasons why two GM lines

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Poundage Used in '59 Cars for . . .

	Zinc	Stainless	Aluminum
Chevrolet	56 lb	37 lb	27 lb
Pontiac	69	37	49
Oldsmobile	40	35	59
Buick	81	35	75
Cadillac	90	37	78
GM's Average	**67**	**36**	**58**
Ford	57	25	59
Edsel	74	35	59
Mercury	83	36	61
Lincoln	92	40	92
Ford's Average	**77**	**34**	**68**
Plymouth	28	29	61
Dodge	64	30	73
De Soto	61	38	86
Chrysler	54	44	88
Imperial	84	24	100
Chrysler's Average	**58**	**33**	**82**
Rambler	67	26	50
Lark	34	16	19
Industry Average	**61**	**29**	**55**

Adapted from figures presented by Alcoa, AZI, AISI Stainless Committee.

are returning to zinc diecast grilles next year.

• **Aluminum's Still Here**—Where does this leave aluminum? Reynolds Metals Co., Richmond, Va., says you have to compare metals on a volume instead of a weight basis. Stainless and zinc men are quick to point out that metals are sold by the pound, not the cubic inch.

Admits an aluminum company engineer: "There's no doubt that the industry still uses zinc plated parts as the standard for the finish they want. Aluminum can't compete with that kind of finish on castings. We don't have any inexpensive method of plating our diecastings, and when they are plated, they're subject to surface corrosion just like zinc parts. Anyway, plating parts is just defeating our natural sales advantages. All we're trying to do is compete with zinc on its level instead of ours."

• **It Plans to Stay**—But aluminum people are watching a new plating method which may find favor in the auto industry. Several firms are turning from sulfuric to phosphoric anodizing. The slightly more porous surface produced makes for better plating. It costs more than plain anodizing, but it does offer better corrosion protection, compares with zinc's looks, and weighs less. It may be used in a few parts where weight is a more critical factor than cost.

The aluminum people are even more excited about their bright finished product. It's bright dipped after anodizing and doesn't require buffing. Carbuilders plan to use it for some 1960 parts.

• **In Functional Parts** — Despite emphasis on trim which has an immediate sales impact, it still looks like aluminum's real future is in the strictly functional areas. Reynolds' molten metal contracts with GM and Ford are pretty clear evidence that the auto industry plans to use more aluminum. Automakers are pretty blunt about it.

John J. Cronin, GM vice president, has predicted: "It is entirely possible that the average GM use of aluminum may increase to 75 lb per automobile in 1965."

Adds Earl Ward, Ford Motor Co.'s purchasing vice president: "Where strong, lightweight, thin-walled castings with close tolerances are required, we generally specify aluminum alloyed material. It is quite possible that we will find aluminum castings economically and functionally advantageous for use in such products as power steering and power brake assemblies and for use in certain chassis parts." Ford anticipates using 127 million lb of aluminum this year, an increase of 71 million lb since 1954.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,112
March	576,085	357,049
3 Mo. Totals	1,600,326	1,238,676
April		316,503
May		349,474
June		337,355
July		321,053
August		180,324
September		130,426
October		261,696
November		514,099
December		593,920
Total		4,243,526

Week Ended	1959	1958
Mar. 14	134,283	86,447
Mar. 21	135,466	80,560
Mar. 28	121,832	93,844
Apr. 4	133,878	64,318
Apr. 11	133,692†	84,997
Apr. 18	133,000*	73,219

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

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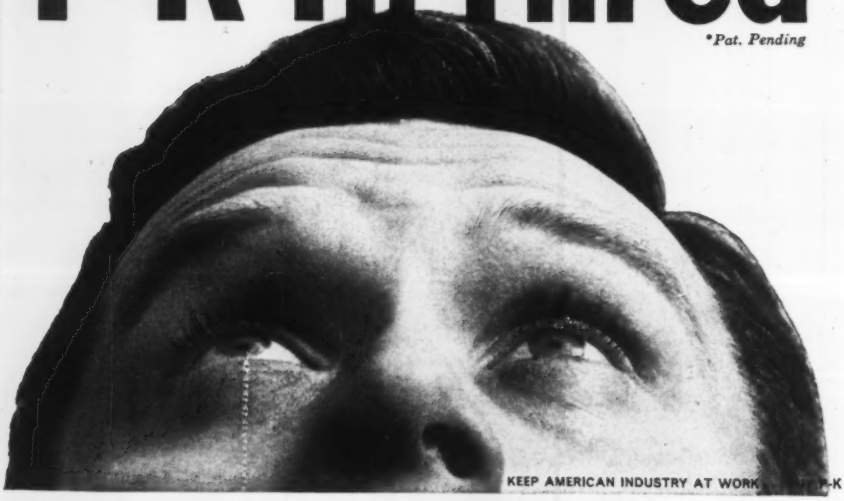

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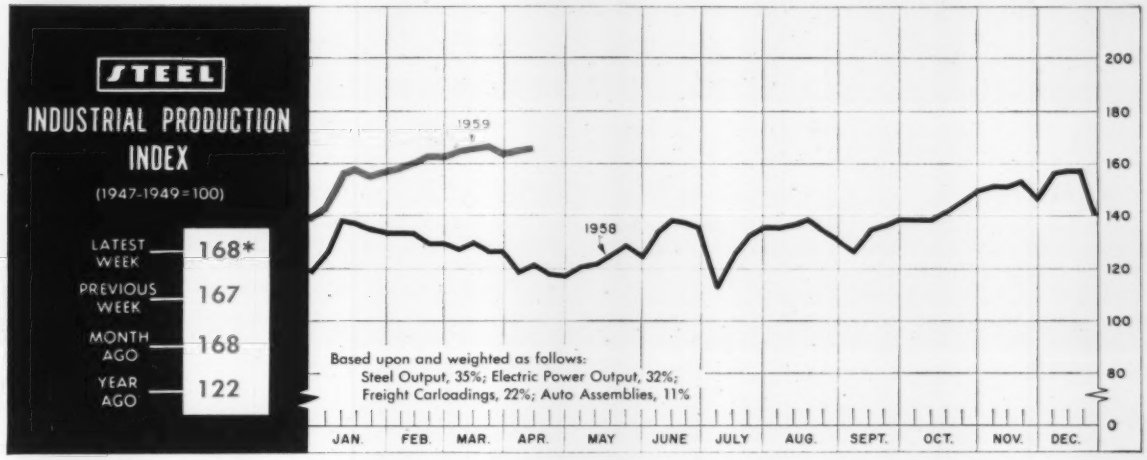

*Week ended Apr. 11.

Appliance Men Revise Goals Upward

APPLIANCE MAKERS are looking confidently for more improvements in sales and shipments the rest of the year. They're convinced that the better than expected results of the first quarter were no mistake.

The trend lines seen in the graphs on Page 70 are typical of those for most segments of this important industry. As in most other industries, some of the comparative gains between now and a year ago can be attributed to the recession, which was hitting bottom about this time last year. But relative improvement is also the result of an uptrend in sales which started last August or September.

• **Dual Reason** — Some producers contend that the shakeout in 1958 might have been a good thing in the long run. Stocks of most appliances, which were unwieldy from the plant right through distributors and dealers, were worked off. Part of the upswing in the fall was due to rebuilding inventories.

But about the same time, consumer purchases and home building began picking up. As a result, stocks today still are not as high as some industry spokesmen think they should be to support the higher level of sales.

Appliance makers were among the first to up their steel orders last fall and start that industry on its way back from the recession. About 2.5 per cent of all finished steel mill shipments are to this industry.

Among the highlights of its recovery are:

• **Laundry Equipment**—Total factory sales in January and February ran 18 per cent ahead of the corresponding 1958 figures, and preliminary estimates for March show a continuation of that trend. At the end of 1958, the American Home Laundry Manufacturers' Association forecast a gain of 5 or 6 per cent for 1959 over 1958. But the first quarter was better than it expected, and now an industry

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,648[1]	2,641	1,285
Electric Power Distributed (million kw-hr)	12,650[1]	12,618	11,307
Bituminous Coal Output (1,000 tons)	6,845[1]	7,810	6,283
Crude Oil Production (daily avg—1,000 bbl)	7,180[1]	7,129	6,187
Construction Volume (*ENR*—millions)	$469.8	$338.3	$354.6
Auto, Truck Output, U. S., Canada (*Ward's*)	169,811[1]	169,727	110,663
TRADE			
Freight Carloadings (1,000 Cars)	600[1]	590	521
Business Failures (Dun & Bradstreet)	284	297	352
Currency in Circulation (millions)[3]	$31,280	$31,225	$30,744
Dept. Store Sales (changes from year ago)[3]	−13%	+16%	+11%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,171	$21,869	$19,320
Federal Gross Debt (billions)	$285.8	$282.0	$272.3
Bond Volume, NYSE (millions)	$31.2	$32.0	$25.3
Stocks Sales, NYSE (thousands of shares)	15,626	15,642	10,376
Loans and Investments (billions)[4]	$95.5	$93.6	$89.5
U. S. Govt. Obligations Held (billions)[4]	$30.5	$29.4	$28.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	219.2	219.3	195.9
All Commodities[7]	119.5	119.5	119.6
Commodities Other than Farm & Foods[7]	127.9	127.9	125.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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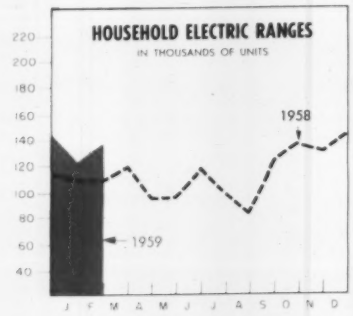
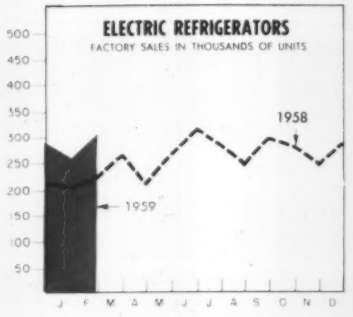
Address.....

THE BUSINESS TREND





	Total Factory Sales—Units		
	1959	1958	1957
Jan.	120,800	109,000	144,500
Feb.	134,600	108,700	127,700
Mar.	.....	117,900	139,400
Apr.	.....	95,600	107,200
May	.....	96,000	93,600
June	.....	116,800	102,300
July	.....	98,500	88,700
Aug.	.....	81,400	85,800
Sept.	.....	121,800	124,800
Oct.	.....	135,500	120,400
Nov.	.....	129,000	116,800
Dec.	.....	143,900	113,800
Totals	.....	1,354,100	1,365,000

National Electrical Mfrs. Assn.
Charts copyright, 1959, STEEL.

	1959	1958	1957
Jan.	256,200	206,100	305,400
Feb.	306,200	227,800	298,700
Mar.	.....	261,100	309,300
Apr.	.....	210,800	281,600
May	.....	262,900	303,700
June	.....	316,300	305,100
July	.....	279,700	318,000
Aug.	.....	245,900	240,500
Sept.	.....	295,800	265,200
Oct.	.....	277,900	261,500
Nov.	.....	245,500	246,400
Dec.	.....	286,900	214,600
Totals	.....	3,116,700	3,350,000

National Electrical Mfrs. Assn.

spokesman says the year may end up as much as 15 per cent ahead of 1958. There is even an outside chance that industry sales (washers, dryers, and combinations) may come close to the record (6 million units in 1956). They were slightly over 5 million units last year.

The industry faces a seasonal downturn this month—it has had one every year since 1948—but officials feel that the dip will be much shallower than last year's.

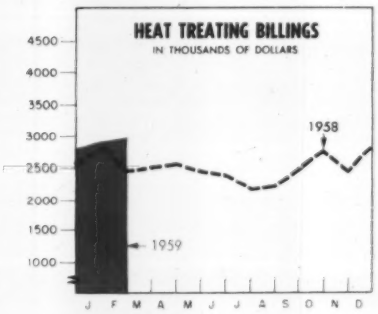
• **Gas Appliances**—Makers of gas ranges and water heaters expect sales increases of 10 to 15 per cent over 1958's. In their industry forecast published last December, they figured on gains of only 2.5 per cent for ranges and 4.6 per cent for water heaters. Says Edward R. Martin, director of marketing and statistics for the Gas Appliance Manufacturers Association Inc.: "We didn't have the opportunity to properly evaluate the fourth quarter upturn . . . it has continued right into 1959."

Automatic gas water heaters continue to be the bright spot for these manufacturers, just as they were all through the recession. They were one of the few major appliances to end up ahead of the 1957 pace last year. For the first two months of this year, they were 10 per cent ahead of the corresponding 1958 figure. The spurt in home building has had a more direct effect on this segment of the industry than on most others. And with 1959 housing prospects still looking good, there seems to be little to worry about for makers of water heaters.

With the built-in units becoming more popular, housing is also having a greater effect on kitchen range sales. While output of all types of gas ranges is increasing, the biggest gains are in this newer market, GAMA statistics show. During the first two months of this year, sales of the free standing type were 11.6 per cent better than they were in the year-ago period, but built-ins were 57.8 per cent better.

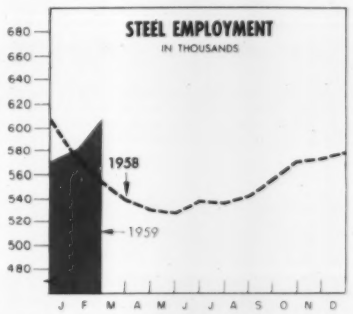
Stocks are moderate — about a month or so, say industry officials. They detect a tendency toward lower stocks this year.

• **Radios and TV** — After taking quite a setback last year, the electronics industry looks like it will make it nearly back to the 1957 levels in sales of radios and television sets. During the first quarter, retail sales of radios (except automotive) amounted to 1.7 mil-



	1959	1958	1957
Jan.	2,915.5	2,825.5	3,533.9
Feb.	2,976.0	2,466.3	3,378.9
Mar.	.....	2,495.4	3,631.8
Apr.	.....	2,542.6	3,572.4
May	.....	2,421.5	3,389.6
June	.....	2,374.8	2,912.1
July	.....	2,139.6	2,767.5
Aug.	.....	2 213.0	2,830.8
Sept.	.....	2,457.1	2,765.6
Oct.	.....	2,744.9	3,076.2
Nov.	.....	2,422.0	2,677.2
Dec.	.....	2,799.4	2,579.3

Metal Treating Institute.



	Employment in Thousands		Payroll in Millions	
	1959	1958	1959	1958
Jan.	584	575	$348.0	$297.4
Feb.	607	554	346.8	261.7
Mar.	...	539	....	271.8
Apr.	...	529	....	259.1
May	...	527	....	270.1
June	...	538	....	278.6
July	...	536	....	280.1
Aug.	...	542	....	299.1
Sept.	...	555	....	308.1
Oct.	...	569	....	341.7
Nov.	...	571	....	320.7
Dec.	...	577	....	340.7

American Iron & Steel Institute.

lion units, compared with 1.4 million during 1958's first quarter, show the Electronic Industry Association's tabulations. Industry spokesmen feel the gain should hold for the year, which indicates a minimum of 8.3 million units, against last year's 8 million. With the indicated gains in auto sales, sales of radios should be close to 13 million units this year.

TV sales have done nearly as well. The current selling rate indicates sales for the year of 5.9 million sets, compared with 5.1 million last year. But this is not the year for color to make its big push. Until that time comes, the record output of 7.8 million sets in 1955 will not be challenged.

Index Holds Near Record

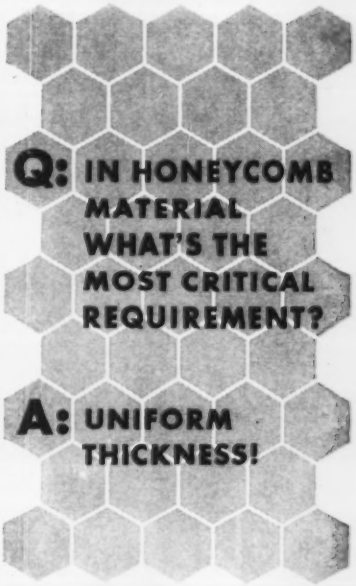
Despite a seasonal weakness in one of its elements (electricity output), STEEL's industrial production index is holding to a hair beneath its all-time record of 169 set in the week ended Mar. 21. Steadiness in steel output and auto assemblies and a slight gain in freight carloadings resulted in a preliminary reading of 168 (1947-49 = 100) for the week ended Apr. 11.

Indications are the record may be matched during the week ended last Saturday (Apr. 18). The steel industry is scheduling operations at about 93.5 per cent of capacity. If it makes it, the tonnage will be close to 2,650,000 net tons for ingots and castings, representing the seventh consecutive week in which output has set a record.

With the increase in manufacturing activity, carloadings will continue to make small gains until the Great Lakes shipping season gets well underway. The *Wilfred Sykes*, flagship of the Inland Steel Co. fleet, opened the ore season on Apr. 10 with a shipment from Escanaba, Mich., and U. S. Steel Corp.'s Pittsburgh Steamship Div. got underway the same day with a load of limestone.

The worst ice jam in years still blocks upper lakes ports, but Pittsburgh Steamship hopes to have 53 ships in operation before the end of this month. The resulting strength in carloadings in early May could bring on another production index record.

Auto and truck assemblies are holding level at about 160,000 units a week, and improved sales indicate that producers will keep schedules about as is for several more weeks.



In a recent nation wide survey of honeycomb section manufacturers by an independent research organization, 75% of the responders indicated that uniform thickness of the thin metal core material was the most important factor demanded of suppliers.

With modern equipment, such as Accu-Ray gauges, Sendzimir rolling mills and unique vertical annealing furnaces, Somers combines 50 years of pioneering in the thin metal field to answer this problem with Somers Thin-Strip®, produced exclusively by Somers Brass Co., Inc.

Somers also guarantees width tolerances as close as ± .001", a plus feature that assures the highest precision in honeycomb structures.

Whether your thin metal problem be in stainless, nickel or its alloys, copper or its alloys, 17-7, PH-15-7 MO or other honeycomb metals, you can depend on Somers ThinStrip® to meet your most critical specifications.

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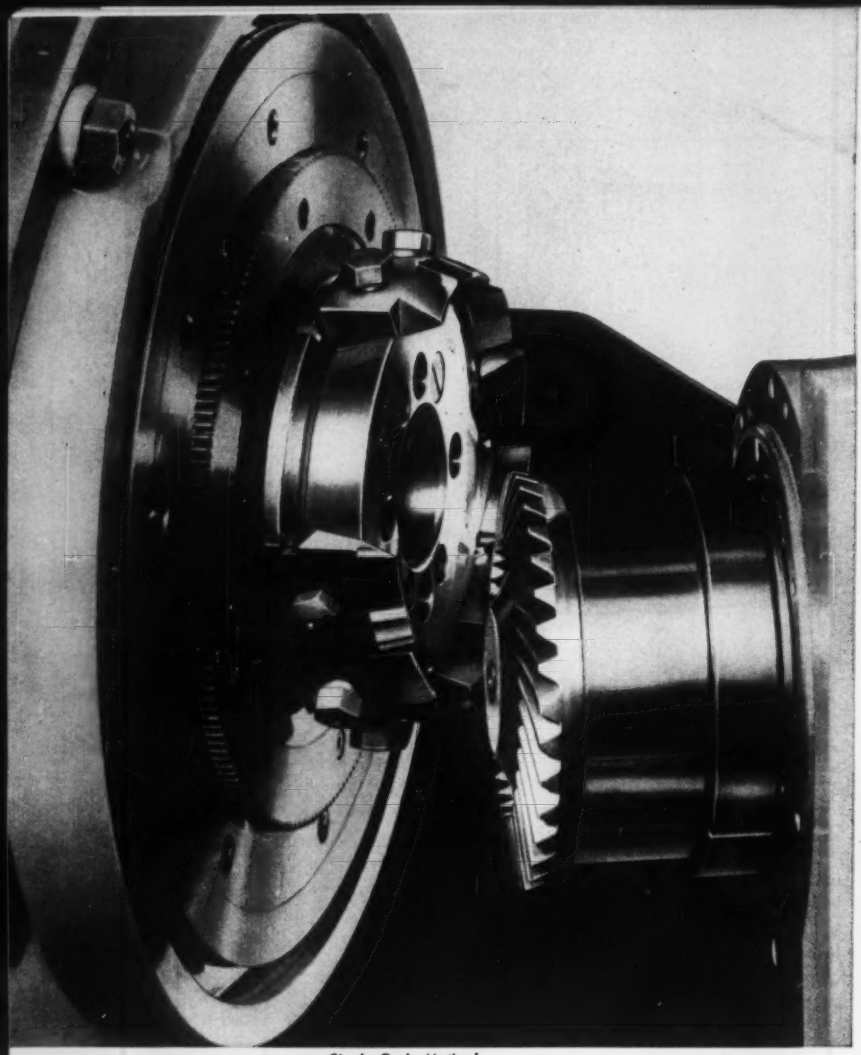
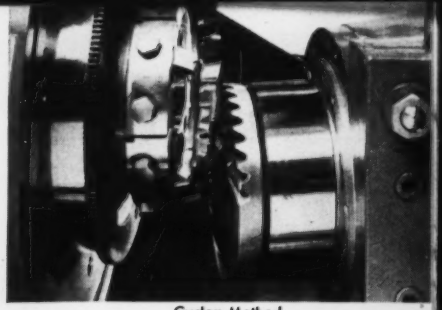
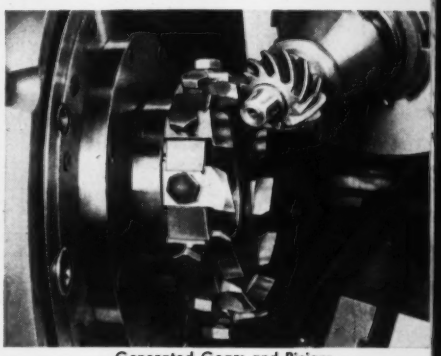


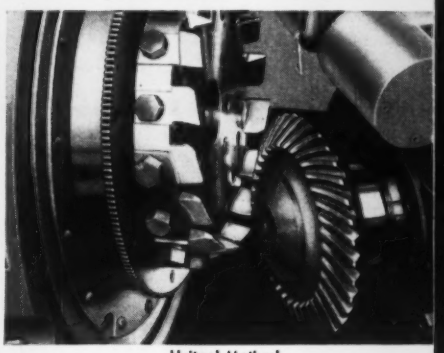
Single Cycle Method



Cyclex Method



Generated Gears and Pinions



Unitool Method

Cut gears with *four* different methods on *one* machine

If you expect your gear needs to change over the years you'll appreciate the exceptional versatility of the Gleason No. 108 Hypoid Generator. With this one machine you can cut both gears and pinions by four different methods:

Single Cycle® Method. Using this method you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine using the conventional single-roll Generating Method.

Cyclex® Method. For certain applications you can use the extremely fast Cyclex Method on the No. 108 Generator. You cut nongenerated gears in one completing operation from the solid blank.

Generated Gears and Pinions. You can produce both gears and pinions on this machine with the Generating Method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter.

Unitool* Method. If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

The No. 108 Generator cuts gears up to 8½" diameter at a 10:1 ratio and to a maximum of 4 DP. You can get the same versatility in cutting larger gears with the No. 118 Hypoid Generator which handles gears up to 18" diameter, 10:1 ratio, to a maximum of 2 DP. A third model, the No. **28** Hypoid Generator, cuts gears up to 33" diameter at 10:1 ratio, 1½ DP.

Send for free bulletins on all three machines.

*Trademark

GLEASON WORKS

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BRUCE E. OLSEN
Standard Screw chief eng.

WILLIAM R. MANSON
Hettrick mfg. mgr.

RICHARD H. STARRETT
Pfaudler chief production eng.

C. ROBERT DERHAMMER
Lakeside Steel president

Standard Screw Co., Bellwood, Ill., promoted **Bruce E. Olsen** to chief engineer for its Stanscrew fastener line. He has headquarters at Standard's Chicago Screw Co. Div., but will work with staff personnel at other fastener producing divisions—Hartford Machine Screw Co. and Western Automatic Machine Screw Co. Most recently, he served Chicago Screw as assistant chief engineer-fastener products.

William R. Manson was appointed manufacturing manager, **Hettrick Mfg. Co.**, Toledo, Ohio, subsidiary of Buckeye Corp. He was with R. D. Werner Co., Greenville, Pa., as vice president and plant manager.

Henry G. Piper was made manager-alloy product sales, **Brush Beryllium Co.**, Cleveland. He was with Western Brass Mills Div., Olin-Mathieson Chemical Corp.

John F. Crowther, former general manager, Chem-Mill Div., was elected vice president-manufacturing, **Turco Products Inc.**, Los Angeles. **George H. Fox Jr.**, former sales manager, Chem-Mill Div., was made division manager of the new Chem-Mill & Coatings Div.

James C. Humphries was named to the new post of west coast district manager in charge of aircraft-missile fastener sales for **Standard Pressed Steel Co.**, Jenkintown, Pa. He is in Santa Ana, Calif. He was district manager on the West Coast and is succeeded by **Lewis W. Johnston**, whose offices are at the El Segundo, Calif., warehouse.

Richard H. Starrett was appointed chief production engineer at **Pfaudler Co.**, Rochester, N. Y., a division of Pfaudler Permutit Inc. He was chief engineer at Pfaudler's Elryia, Ohio, plant.

W. W. Durand was named chief metallurgist at **Crucible Steel Co. of America's** Park Works, Pittsburgh. He replaces **F. L. Moffet**, transferred to company headquarters and assigned to the technology department.

W. W. Davis was appointed prestress planning engineer for **Leschen Wire Rope Div.**, St. Louis, H. K. Porter Company Inc.'s He was with the Riverside, Calif., Div. of Food Machinery & Chemical Corp.

John Fuqua was made chief plant metallurgist, **Cooper Alloy Corp.**, Hillside, N. J. He previously served as senior research metallurgist for American Steel Foundries and as works manager of Hica Inc.

Walter E. Max was made assistant general manager of **Worthington Corp.'s** Compressor & Engine Div., Buffalo. **Howard E. Ewell** was made manager of manufacturing.

Kenneth B. Ris, president of **Griscom-Russell Co.**, Massillon, Ohio, subsidiary of General Precision Equipment Corp., was elected chief executive officer following the resignation of **T. Kennedy Stevenson** as chairman of the executive committee and chief executive officer. **Edward H. Townsend** was elected executive vice president; **N. T. Griffiths**, assistant to the president.

C. Robert Derhammer was elected president of **Lakeside Steel Improvement Co.**, Cleveland. He succeeds his father, the late **C. W. Derhammer. John H. Ries** was appointed executive vice president-treasurer; **Robert T. Morrow**, vice president-sales manager.

Alvin H. Barrows was appointed manager of sales, Cleveland district, **U. S. Steel Corp.** He succeeds **Boyd P. Doty Jr.**, recently made general sales manager, American Steel & Wire Div. Mr. Barrows was Indianapolis district sales manager. **Samuel A. McFarland Jr.** was made manager of sales, Indianapolis, and is replaced as assistant manager, stainless steel products section, Pittsburgh, by **W. Kenneth Dorman.**

Robert Sellin was elected vice president, **Midland Screw Corp.**, Chicago. He was manager of the Los Angeles plant, and is replaced by **Robert Schultz.**

W. Norman Ritchie was appointed chief engineer, **K W Battery Co.**, Skokie, Ill. He was with Gould-National Batteries Inc.

Alfred B. Glossbrenner was named superintendent, conditioning department, **Timken Roller Bearing Co.'s** Steel & Tube Div., Canton, Ohio.

James S. Peebles was made superintendent of industrial relations at Republic Steel Corp.'s **Berger Div.**, Canton, Ohio. He succeeds **T. R. Alexander**, recently promoted and transferred to the industrial relations staff in Cleveland. **Howard**

L. D. ALPERT

P. H. JACKSON

Federated Metals management changes

WILLIAM M. CONNOR

SAMUEL W. BROWN

management posts at Rockwell plants

G. Vilsoet was named Buffalo district manager for the Berger Div.

Federated Metals Div, American Smelting & Refining Co., New York, named **L. D. Alpert** general manager of its Whiting, Ind., plant, replacing **S. A. Glueck**, resigned. **P. H. Jackson** succeeds Mr. Alpert as general manager, eastern department. Mr. Jackson, former vice president-general manager of Federated Metals Canada Ltd., is succeeded by **G. F. Norman**, former manager of Federated Canada's Montreal plant. **H. Trihey**, the plant's sales manager, succeeds Mr. Norman.

Clive C. Earle was made sales manager; **Robert H. Marta**, manager of the general order department at the Philadelphia plant of **Joseph T. Ryerson & Son Inc.**

Alfred H. Busch, secretary, **Stewart-Warner Corp.**, Chicago, was named to the additional post of treasurer, succeeding **Fred P. Kirch**, retired.

Fred R. Lentz was made eastern regional sales manager; **Mark W. Royston**, western regional sales manager for **Sutorbilt Corp.**, Compton, Calif.

John Wampler was made manager; **Ralph Marsh**, assistant manager of the pricing department of **Youngstown Sheet & Tube Co.**, Youngstown. Mr. Wampler succeeds **R. E. Williams**, retired.

Philip A. Newhart was appointed a metallurgical engineer, Pig Iron & Coal Chemicals Sales Div., **Republic Steel Corp.**, Cleveland. He was manager of foundries, Metal Products Div., Koppers Co.

William M. Connor, assistant to the vice president of **Rockwell Mfg. Co.**'s Meter & Valve Div., was promoted to general manager of the Statesboro, Ga., plant. He succeeds **Samuel W. Brown**, transferred to the Uniontown, Pa., plant as assistant general manager.

Gilbert F. Richards was made director of automotive sales for **Budd Co.** He has headquarters at the Charlevoix plant in Detroit. He joined Budd last July as sales manager, airframe section, Defense Div., following two years as vice president-sales, Sharples Corp.

F. Rupert Glass was made Detroit sales manager, **Wilkening Mfg. Co.** The new Detroit office opened in the New Center Bldg.

Robert G. Schreiber was named to manage the new office opened by **Reynolds Metals Co.** at Jackson, Mich.

Warren T. Trask was named manager of the metal divisions of St. Louis and southwestern branches of **National Lead Co.** **Ray R. Stamm** was made a special representative for fabricated metal products.

Bridgeport Brass Co. named **Joseph Linus** Philadelphia district sales manager to succeed **Philip Bush**, now sales manager, Condenser Tube Div. **Carl J. Mercer** was named Indianapolis district sales manager to succeed **Kenneth Case**, who transferred to headquarters in Bridgeport, Conn., as assistant sales manager, Plumbing & Heating Div. **John Foss** replaces **John Armanino** as Seattle district sales manager. Mr. Armanino transfers to the Riverside, Calif., plant. **R. Adrian Logan** was made manager of the new district sales office in Memphis, Tenn.

T. Frank Saffold was named manager of **Westinghouse Electric Corp.**'s specialty transformer department at Greenville, Pa. He was assistant to the manager of the large rotating apparatus department at East Pittsburgh.

Roy R. Brewton was named vice president-controller, **Convair Div.**, San Diego, Calif., General Dynamics Corp.

R. H. Mezger was made district manager, Worcester, Mass., industrial sales office, **Vickers Inc.**, division of Sperry Rand Corp. He was St. Louis district manager.

Charles H. Dewey was appointed general manager of **Republic Steel Corp.**'s northern ore mines, and **Joseph R. McVicker** was appointed general manager of coal mines. They have headquarters in Cleveland, and succeed **E. B. Winning**, retired.

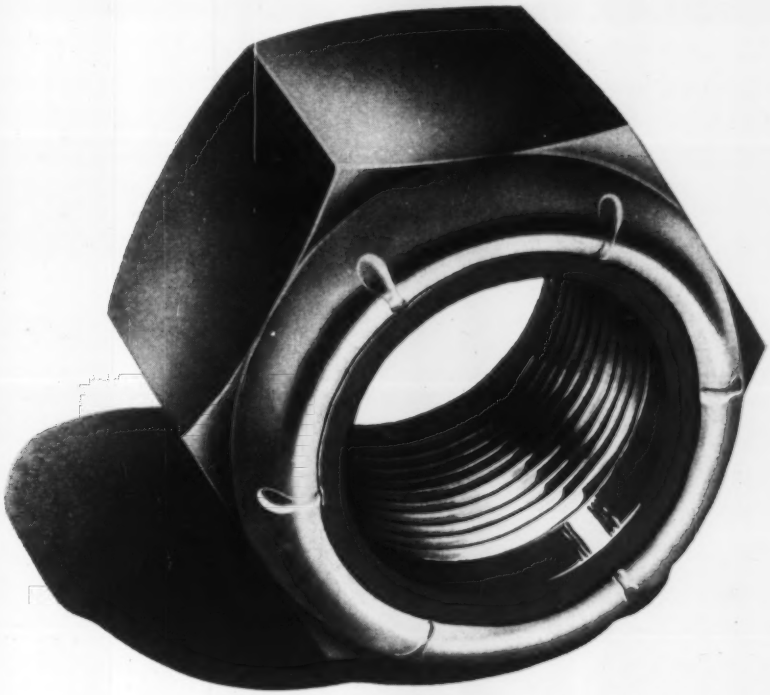
D. E. Butler was elected vice president-sales, **Airaterra**, Glendale, Calif. He was general sales manager.

Lee A. Colbath was named district manager for Georgia, South Carolina, and Florida for **Edward Valves Inc.**, subsidiary of Rockwell Mfg. Co. He has offices in Atlanta.

Charles T. Smith was appointed an assistant marketing manager, Boiler Div., Canton, Ohio, **Babcock & Wilcox Co.**

B. H. Wildenhaus was appointed manager of distributor sales, **Si-**

How many times can this nut be re-used?



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for over 50 on-off cycles

The remarkable wear resistance of the tough nylon collar plus its elastic recovery characteristic make it possible to remove and re-use the standard Elastic Stop nut at least fifty times. This familiar red collar—an integral part of an Elastic Stop nut—grips the entering bolt threads with a perfect fit which dampens impact loads and resists turning under the most severe conditions of vibration and shock. When the nut must be removed for routine maintenance, the nylon collar tends to resume its original shape and, on re-installation, grips the bolt threads as effectively as on the original installation.

Prove it to yourself! Check the coupon for a copy of Recommended Test Procedure for Determining Re-usability.

Re-usability is just one of the advantages of the nylon insert Elastic Stop nut. The constant torque that locks the nut at any position on the bolt: the inertness to gasolines, oils, salt atmospheres, cleaning compounds and common acids: the easy identification on the assembly line or in the field: the one piece construction that simplifies installation and reduces cost—these special features have made the Elastic Stop nut the standard of industry for tough applications.

Elastic Stop nuts are available in thin and regular height hex types in sizes ranging from a watchmaker's 0-80 through 3 inches, also many special shapes to meet your unusual design problems. In standard finishes and materials including carbon and stainless steels, brass, duronze and aluminum.

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DOUBLE DEPENDABILITY

The dependability built into every Elastic Stop nut builds itself into the dependability of every product on which it is used.

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Please send me the following free fastening information:

- ☐ Recommended Re-usability Test Procedure
- ☐ Bulletin No. 5901 showing stop nut design applications on heavy-duty equipment.
- ☐ ESNA condensed hex nut catalog No. 706.

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Title_____

Firm_____

Street_____

City_____ Zone____ State_____

PAUL F. BRUNING
Vard factory manager

GLENN F. WHITELEY
Heppenstall plant mgr.

JOHN C. BEACH
Taller & Cooper v. p.

ROYAL A. STONE
heads new Rolock div.

EDMUND C. AUSTIN
Fluor v. p.-procurement

K. H. CARLSON
Latrobe tech. mgr.

monds Worden White Co., Dayton, Ohio.

Rolock Inc., Fairfield, Conn., appointed **Royal A. Stone** to head its new process equipment division, with emphasis on special engineering.

Edmund C. Austin, former director of purchases, was named to the new post of vice president-procurement, **Fluor Corp. Ltd.**, Los Angeles.

Frank J. Smollon Jr. was made general manager, Industrial Products Div., **Maryland Shipbuilding & Drydock Co.**, Baltimore.

Earl Erdman joined **Taylor Fibre Co.**, Norristown, Pa., as group leader for its resins research section. He was chief chemist with Synvar Corp.

Samuel A. Glueck was made assistant to the president of **H. Kramer & Co.**, Chicago. For the last 25 years, he has been associated with Federated Metals Div., American Smelting & Refining Co.,

K. H. Carlson was appointed technical manager-specialty steels, **Latrobe Steel Co.**, Latrobe, Pa. He has been doing research and development on high temperature alloys, bearing steels, high strength aircraft steels, and vacuum melted steels.

R. R. Sanger was named president, **Baldwin Mfg. Co.**, Toledo, Ohio. **S. W. Poore**, who was president-chairman, continues in the latter post.

Robert Parshall was made sales manager, Ventilation Div., **Swartwout Co.**, Cleveland.

Macauley Carter was made sales manager, Petroleum Refinery Div., **Arthur G. McKee & Co.**, Cleveland.

Carl Epperley was named manager, **Hawker Mfg. Co.**, Dayton, Ohio, division of East Dayton Tool & Die Co.

Charles Nater was made chief engineer, Instrument Div., **Beckman & Whitley Inc.**, San Carlos, Calif.

Paul F. Bruning was appointed factory manager in charge of manufacturing at **Vard Inc.**, Pasadena, Calif., subsidiary of Royal Industries Inc. He was vice president-manufacturing at Holly-General.

Glenn F. Whiteley was appointed manager of the Bridgeport, Conn., plant of **Heppenstall Co.** He succeeds **Edward W. Moffitt**, who transferred to the Midvale-Heppenstall Co. plant in Philadelphia.

John C. Beach was appointed vice president-general manager, **Taller & Cooper Inc.**, Brooklyn, N. Y., subsidiary of American Electronics Inc. He held an executive post at Hall-Scott Inc., and previously served for a number of years with Remington Rand Div., Sperry Rand Corp.

J. G. Buzzard was made sales representative in Pittsburgh for **Ohio Ferro Alloys Corp.**

David C. Skelly was named manager of the quality control laboratory at **Harbison-Walker Refractories Co.**'s Hays Work near Pittsburgh.

James F. Boyle was made assistant purchasing agent, **E. F. Hauserman Co.**, Cleveland. He was formerly with Abrasive Tool & Supply Co.

A. Loring Rowe was appointed vice president and secretary, **La Salle Steel Co.**, Hammond, Ind.

Frederick G. Plett was promoted to manufacturing superintendent of **Sylvania Electric Products Inc.**'s semiconductor plant at Hillsboro, N. H.

OBITUARIES...

Raymond B. Tripp, 67, executive vice president, **Ohio Forge & Machine Corp.**, Cleveland, died Apr. 10 in Tryon, N. C. He was past president of the Drop Forging Association and American Gear Manufacturing Association.

Charles Jones, 54, vice president for public and industrial relations of **John A. Roebling's Sons Corp.**, Trenton, N. J., died Apr. 12.

Marvin J. Udy, 66, vice president and consultant of **Strategic-Udy Processes Inc.**, Niagara Falls, N. Y., died Apr. 11.

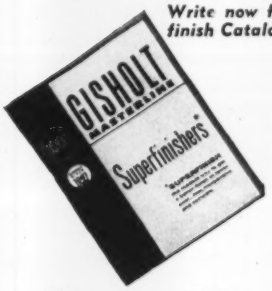
do you have *OIL SEAL TROUBLES?*

SUPERFINISH
can solve them!

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished,* and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for new Superfinish Catalog No. 1169-B



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Madison 10, Wisconsin

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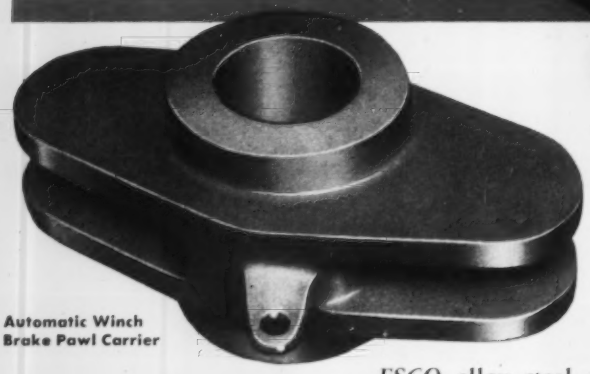

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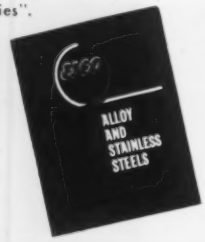

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Bethlehem to Build Re-bar Mill at Steelton Plant

BETHLEHEM STEEL CO., Bethlehem, Pa., will construct a mill for rolling steel reinforcing bars at its Steelton, Pa., plant. Construction will begin in July and is scheduled for completion about January, 1961.

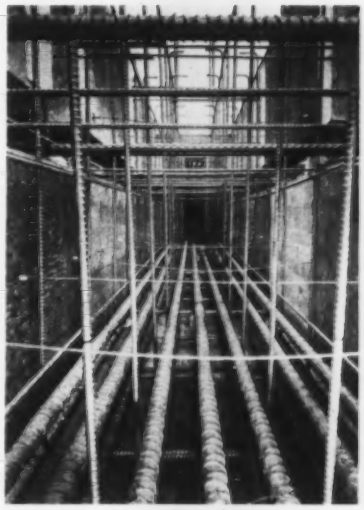
The mill will have an annual capacity of 350,000 tons in a range of sizes: From No. 3 (0.376 lb per ft and 0.375 in. in diameter) through No. 11 (5.313 lb per ft and 1.410 in. in diameter). Bars will be the deformed concrete reinforcing type.

The product is a new one at the Steelton plant, which produces rails and accessories, trackwork, forgings, castings, expanded line pipe, and billets for the company's Lebanon, Pa., plant, and slabs for the Sparrows Point, Md., plant.

• **Facilities**—An oil-gas fired, continuous furnace will heat billets supplied by the rail mill. The billets will be fed into the rolling mill, which will be of the continuous type, 2-strand with 17 stands, including two looping stands. Two hot beds with shearing facilities at the discharge end will complete the main facilities.

About 240 men will be employed when the mill gets into regular operation.

Potential demand calls for an increase in capacity at present domestic mills. Heavy construction awards are the heaviest since boom 1956. They're running at an estimated $355.4 million weekly (see STEEL, Apr. 13, p. 141). Road building, another major reinforcing bar consumer, is in the midst of its biggest program. It will hit a record of $6 billion this year, including about $2.3 billion under the Federal Interstate Highway System. It takes a lot of steel to make a modern freeway, as shown in the accompanying photograph.



Steel reinforcing bars of all sizes and dimensions are linked in this supporting cap for a viaduct. Each cap in the structure contains about 9.5 tons of steel to support 80 ft long concrete girders. The bars were produced by Bethlehem Pacific Coast Steel Corp.

Opens Aluminum Smelter

American Smelting & Refining Co., New York, is in volume production of aluminum alloys at its secondary smelter in Alton, Ill. The plant has a production capacity of 72 million lb of aluminum ingots annually. It is being operated by Asarco's Federated Metals Div. under the managership of George M. Baumann. The plant maintains a 60 to 90 day supply of aluminum scrap.

Dofasco Buys Oxygen Unit

Dominion Foundries & Steel Ltd., Hamilton, Ont., has ordered another oxygen plant (valued at about $2 million) from Air Liquide of Canada, Montreal, a subsidiary of American Air Liquide, New York. The plant will have a capacity of 150 tons of oxygen a day and is scheduled to go on stream this summer. Dofasco has three, 60 ton capacity oxygen steelmaking furnaces, employed on a rotation basis. Each heat requires about 40 minutes.

The 75 per cent increase in oxygen-producing capacity is a factor in the firm's current $15 million to $20 million expansion program to build ingot potential from 750,000 tons to 1 million tons annually by the fall of 1959. Hot and cold rolling facilities are also being enlarged.

Steelworkers Set Record

The iron and steel industry established a safety record in 1958. Based on accidents involving time lost from work, the new low is 3.21 accidents per million manhours worked in steel plants. Old record: 3.48 in 1957. The industry's safety record has been improving steadily. Last year's accident frequency was 41.7 per cent below the 1949 rate.

Minneapolis Firm Renamed

Vern G. Ellen Co. Inc., Minneapolis, changed its name to Twin City Monorail Co. The company designs, fabricates, and installs overhead material handling equipment.

Griffin to Build Foundry

A cast iron pressure pipe foundry will be built at Council Bluffs, Iowa, for Griffin Pipe Div., Griffin Wheel Co., Chicago. The plant is designed to manufacture pipe by the Delavaud process in sizes 4 through 12 in. in 20 ft lengths.

Bettcher Buys Heater Line

Bettcher Mfg. Co., Cleveland, purchased the Thermobloc Div. from Prat-Daniel Corp., South Norwalk, Conn. Panelbloc infrared heaters and Thermobloc heaters will be manufactured by the Panelbloc Div. of Bettcher Mfg. Co. R. F. Sharon is general manager of the division; Joseph Adams, chief engineer; and Garth Thibideau, service manager.

GE Combines Departments

General Electric Co., Schenectady, N. Y., has combined its Technical Products Dept., Syracuse, N. Y., and its Communication Products Dept., Lynchburg, Va. The consolidated operation is known as the Communication Products Dept., with Harrison Van Aken as general manager. Headquarters are in Lynchburg. Products will include closed

circuit television, two-way radio units, and equipment for the broad field of communication and information handling.

Lockheed Has New Unit

Lockheed Aircraft Corp., Burbank, Calif., has established a high level technical organization, designated LAWSO (Lockheed Antisubmarine Warfare Systems Organization). The group will function as a part of the firm's California Div., directing specialized research and development. It will operate under the over-all direction of B. C. Monesmith, Lockheed vice president and division general manager. E. M. Davis has been appointed LAWSO manager.

Moog Valve Changes Name

Moog Valve Co., East Aurora, N. Y., changed its corporate name to Moog Servocontrols Inc.

NEW OFFICES

United States Steel Corp., Pittsburgh, opened a sales office at 8901 Monterey St., Anaheim, Calif., to market coal chemical products throughout California and Arizona. The office is in charge of William D. McRoy. Western headquarters for the Coal Chemical Sales Div. is at Salt Lake City, Utah.

Cutting Tool Div., Brown & Sharpe Mfg. Co., Providence, R. I., established a Cutter Service Co. in the Double A Valve plant of the Hydraulics Div., E. Duncan Street, Manchester, Mich.

Thompson - Ramo - Wooldridge Products Co., a division of Thompson Ramo Wooldridge Inc., Los Angeles, established an eastern sales engineering office at 200 E. 42nd St., New York 17, N. Y. R. M. Hexter is in charge. The firm established a European office at 7, Avenue George V, Paris VIII, France, under the direction of W. A. Bridges.

Consolidated Electrodynamics Corp., Pasadena, Calif., established a district sales office in Columbus, Ohio. The office is under the managership of Charles J. Leach.

ASSOCIATIONS

ELDRED A. GENTRY

Associated Industries of Cleveland appointed Eldred A. Gentry as associate director of industrial relations. He was personnel manager of the Clevite Research Center, that city. Ben F. McClancy is secretary and general manager of AIC.

American Foundrymen's Society, Des Plaines, Ill., elected these officers: President, Charles E. Nelson, Magnesium Dept., Dow Chemical Co., Midland, Mich.; vice president, N. J. Dunbeck, International Minerals & Chemical Corp., Skokie, Ill.

Metal Powder Producers Association, New York, elected Charles E. Hanson, National-U. S. Radiator Corp., Johnstown, Pa., president. **Ferrite Manufacturers Association**, New York, elected W. W. Garstang, Allen-Bradley Co., Milwaukee, president. These associations are trade divisions of the Metal Powder Industries Federation, New York.

Robert T. De Vore has been named public relations director of the **Instrument Society of America**, Pittsburgh. W. H. Kushnick is executive director of the organization.

Edward A. Norman, Norman Products Co., Columbus, Ohio, was elected president of the **Gas Appliance Manufacturers Association**, New York. Other new officers are: First vice president, W. C. Davis, Cribben & Sexton Co., Chicago, and second vice president, W. G. Hamilton Jr., American Meter Co., Philadelphia. Stanley H. Hobson, Geo. D. Roper Corp., Rockford, Ill., was re-elected treasurer; and Harold Massey, managing director and secretary.

CONSOLIDATIONS

Midland-Ross Corp., Cleveland, acquired **Nelson Metal Products Co. Inc.**, Grand Rapids, Mich., producer of zinc and aluminum diecastings for the automotive industry. Nelson will operate under the direction of the Owosso, Mich., Div., headed by D. E. Walbert, vice president and general manager.

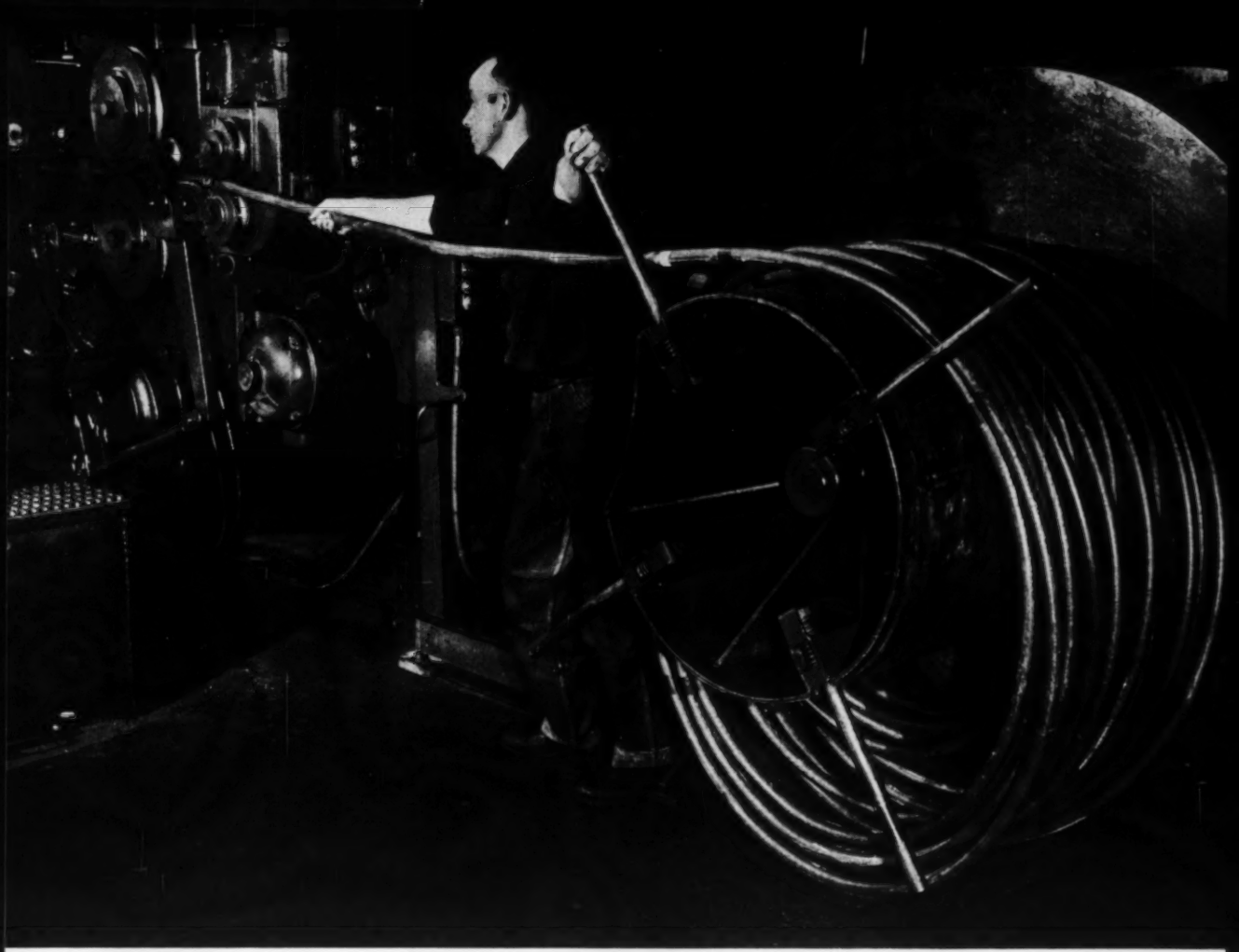
Maytag Co., Newton, Iowa, purchased controlling interest in **American Missile Products Co. Inc.**, Lawndale, Calif., maker of electronic products. Officers of American Missile are: President, Ruben H. Hundley; vice president and treasurer, Gladys Hundley; and secretary, Horace Hahn.

North American Aviation Inc., Los Angeles, will acquire **Foster Wheeler Corp.**, New York, subject to approval by stockholders. Foster Wheeler produces powerplant, processing, and similar equipment, and is a supplier of components for the atomic power industry.

NEW PLANTS

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, completed an oxygen and nitrogen plant at Denver. William O. Brown is in charge of all Airco operations at Denver; L. C. Jones is superintendent of the new facility.

All-Steel Equipment Inc., Aurora, Ill., opened a warehouse at Commercial Warehouse Co., Grove Street and Erie Railroad tracks, Paterson, N. J. The firm makes metal office furniture and equipment.



"New large coils of J&L hot rolled bars permit longer production runs"

. . . states industrial fastener manufacturer

"Use of large coil weights in J&L hot rolled bars enables us to increase production through longer runs, reduced machine downtime," reports Mr. Robert McCombs, General Manager of Russell, Burdsall & Ward's Coraopolis, Pa., plant.

"We are able to cold form ¾" heavy hexagon nuts, 1¼" across the flats, from J&L's C-1110 scrapless nut quality bars, without surface cracks, at high speed. This is a severe test of hot rolled steel quality."

R. B. & W., one of the oldest and largest manufacturers of industrial fasteners, uses J&L steel in both low and medium carbon grades as well as the C-1110 steel.

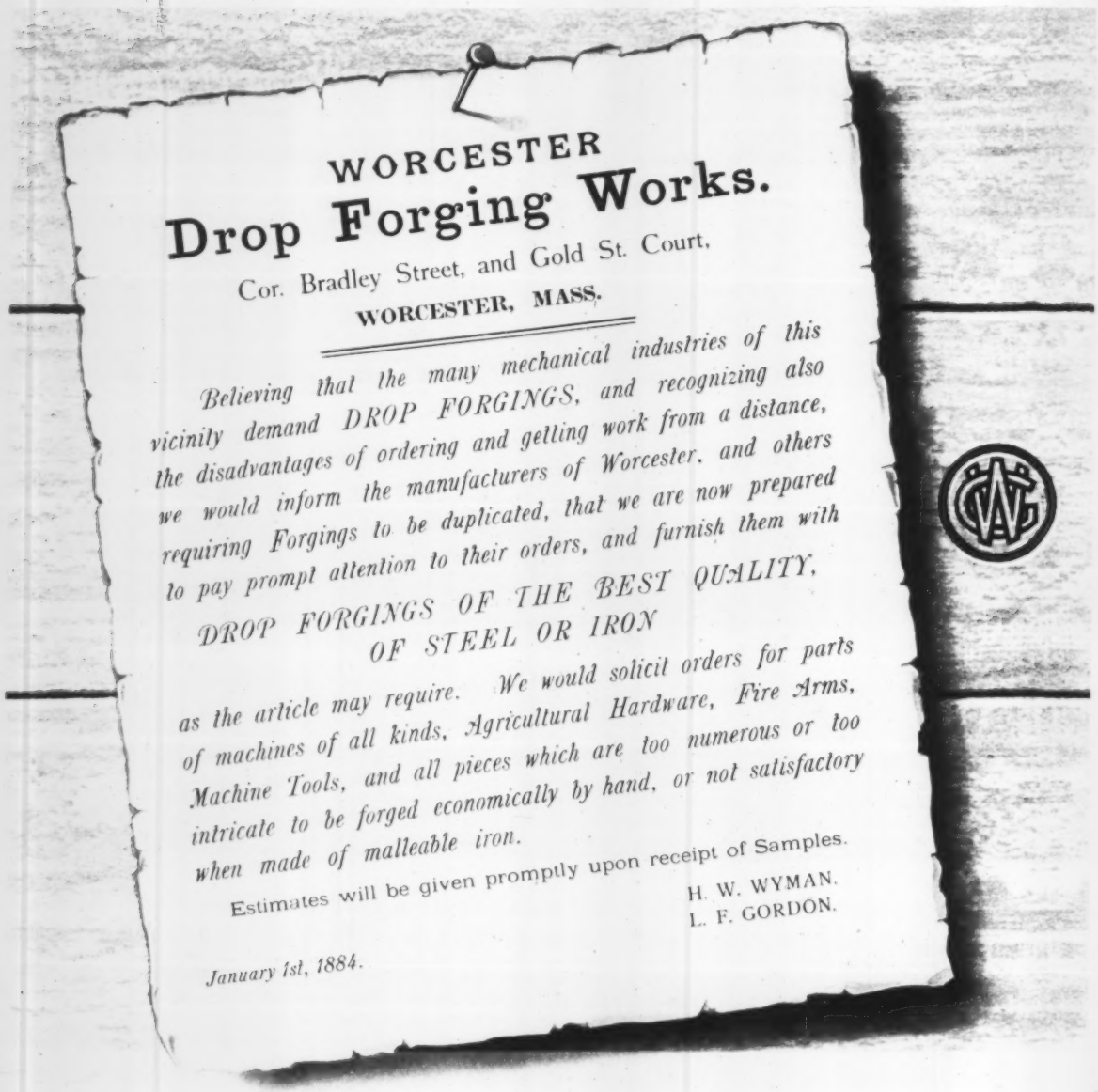
Investigate J&L's superior quality hot rolled bars for your toughest cold forming applications. Bars are now available in coil weights up to 1300 pounds.

Call in a J&L steel specialist for recommendations on how to improve physical characteristics of your end products and to increase your production rate. Write Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L C-1110 scrapless nut quality hot rolled bars, 1½" diameter, are used in producing these R. B. & W. nuts, 1¼" across the flats, with ¾" tapped diameter.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA



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Estimates will be given promptly upon receipt of Samples.

H. W. WYMAN.
L. F. GORDON.

January 1st, 1884.

Reproduced above is the formal announcement made January 1, 1884 of the partnership formed a few weeks previously in November of 1883 and known as the Worcester Drop Forging Works, later to be incorporated as Wyman & Gordon.

Today, after seventy-five years, Wyman-Gordon is still "prepared to pay prompt attention" to *your* orders and to furnish "forgings of the best quality," not only of steel, but of light alloys and all of the new exotic heat-resisting materials including beryllium.

And through the years Wyman-Gordon has continued to concentrate on one product—forgings; and one standard of quality and service—the best.

WYMAN-GORDON COMPANY

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Also Beryllium • Molybdenum • Columbium and Other Uncommon Materials

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BOOST FOR ULTRASONIC WELD— Fatigue results on test specimens indicate that ultrasonic welding is superior to many aircraft fastening methods, J. Koziarski, research engineer, Martin Co., Baltimore, told the American Welding Society last week. He said the method appeared to be especially effective in joining stainless steel.

FUSION WELD WEDS ULTRASONICS— Ultrasonic energy applied during fusion welding and brazing strengthens joints, says Battelle Memorial Institute, Columbus, Ohio. It reduces surface tension, promotes intimate contact, drives off gas bubbles, aids removal of oxides and inclusions, and refines the crystalline structure. Weld metal also cools faster.

ALUMINUM GETS SILVER LINING— The problem of plating aluminum with silver has finally been licked, says Allis-Chalmers Mfg. Co., Milwaukee. The coating will eliminate the problem of high contact resistance caused by ever-present oxide and extend aluminum's conductivity and usefulness in electrical power systems.

MACHINING HOTWORK DIE STEELS— These materials, always tough to machine, can be tamed somewhat by additions of selenium. Studies at Battelle Memorial Institute, Columbus, Ohio, show that additions of 0.05 per cent boosted machinability ratings by 8 per cent in annealed samples. The same additions to heat treated bars (330 Brinell) boosted machinability ratings more than 50 per cent. Francis W. Boulger, who guided the research, reports that more of the material had little effect on machining.

HOT BRITTLENESS BRINGS CHANGE—Most people don't know that stainless steels and nickel alloys have hot brittle points, says Julius Heuschkel, consulting welding engineer, Westinghouse Research Laboratories, Pittsburgh. They can cause perfectly welded structures to fail during heat treatment. Westinghouse research is pinpointing the reaction points and altering preparation, welding, and heat treatment procedures of metals accordingly. (Most stainless steels, for example, are dead brittle for 100° F below their melting points.)

PROGRESS IN HI-TEMP STEEL— By starting with a patented direct reduction process, Aero Alloys Inc., Anaheim, Calif., has produced a nickel-chrome steel that has a tensile strength of 12,000 to 14,000 psi at 2000° F. Aircraft people are taking a look.

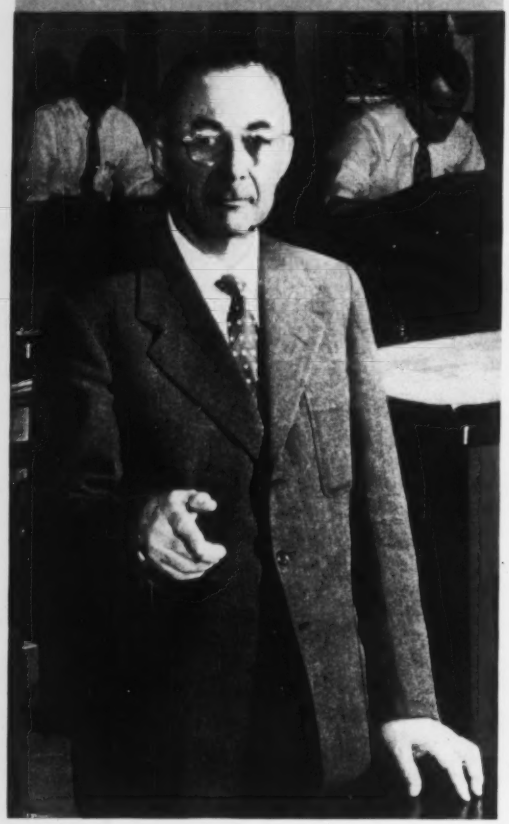
ROLL FORGING REDUCES SCRAP—A two-pass system of forge rolling Zircaloy cover plates for atomic fuel elements may cut scrap 15 to 20 per cent, it was learned at the Nuclear Congress in Cleveland. Material is extended in the rolling direction rather than being machined away. If volume warrants, it is feasible to adapt production to continuous rolling, proponents say.

STAINLESS ELECTRODE PROGRESS— A powder type, stainless welding electrode has a mild steel core covered with powdered materials containing chromium and nickel alloying elements. They are designed to speed up and cut the costs of stainless welding, says Air Reduction Sales Co., New York.

METALLIZING AIDS ALUMINUM GROWTH— Spraying aluminum with molybdenum and steel is solving some aluminum wear problems, states Alcoa. Metallizing Engineering Co. Inc., Westbury, N. Y., says 0.001 in. of molybdenum is overlaid with 0.008 in. of steel. Parts are ground to final size.

WELDS SINTERED MOLYBDENUM— Westinghouse Electric Corp., Pittsburgh, says it can weld sintered molybdenum successfully by carefully controlling the composition and preparation of the sinter. Careful adjustment of the welding variables provides sound, ductile weld deposits—a procedure thought impossible until recently.

The 'Right' Material May Be the Cheapest



"When the covers and housings on our machine tools were made of metal, we were paying for more performance than was required. Use of plastic gives us all the functional properties required at lower cost," says George M. Class, vice president of Gisholt Machine Co. "Fabrication is cheaper, too."

AN ALERT management on the lookout for ways to cut material costs has created a new look for the machine tools built at Gisholt Machine Co., Madison, Wis. They did the job with fiber glass reinforced plastic panels, guards, housings, and covers.

Gisholt first considered the function of the parts. They cover or guard moving parts, protect switches or adjustable controls, prevent contamination, tampering, or accidental movement.

George M. Class, vice president, explains why the company switched materials: "When the parts were made of cast iron, cast aluminum, or fabricated from sheet steel, we felt we were paying for more performance than was required. Use of plastic gives us all the functional properties required of metal parts at lower cost, with fewer secondary operations, and faster assembly."

• **Turret Lathe** — The Gisholt Masterline 1F Fastermatic automatic chucking turret lathe is a good example of how plastics are applied to a machine tool to protect vital parts of the machine and provide a streamlined, modern appearance at less cost.

Fourteen plastic parts are used on the Fastermatics. The combination tool tray and front headstock cover used to be made of cast aluminum. The unit cost of the 27 lb part was $40.25; pattern cost was $396. When made from fiber glass reinforced plastic, the cost of the unit (now 11 lb) is $18; pattern cost is $112.80.

COST CRISIS . . . How to Beat it

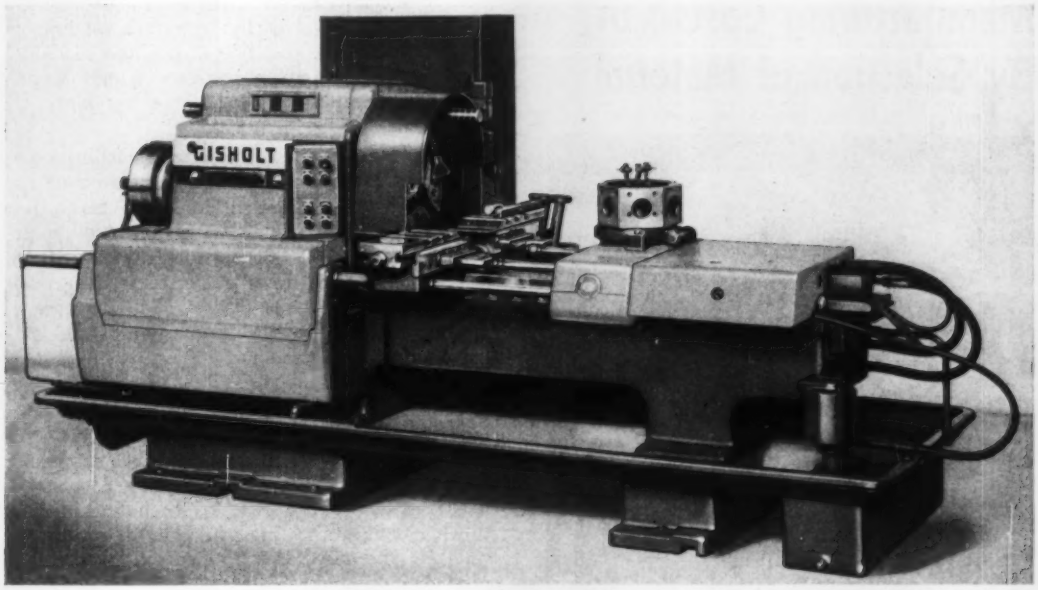
How to Pick the Right Material

MATERIAL SAVINGS are possible only when the people responsible for selection are aware of the factors that control costs and have a desire to help their company make a profit.

The final choice is always a compromise. No one material is ideal.

• The product design stage is probably the most important point at which to control material costs.

Once final approval has been



The lighter colored housings and covers on this Gisholt 1F Fastermatic turret lathe are fiber glass reinforced plastic. They used to be made from cast iron, cast aluminum, and sheet metal

The turret saddle cover was made from four sheet steel parts held in place by 16 screws. Now it is molded in one piece and held in place with four screws.

• **Advantages**—Generally, use of the plastic for machine tool housings brings savings of 30 to 60 per cent.

In some extreme cases, where costs run about the same, the plastic offers advantages that make it a preferred material. It will not warp or change shape, has a greater strength-to-weight ratio than metal and resists corrosion. Its use eliminates many secondary operations because threaded inserts, bosses, bushings, and holes often can be molded into the part.

It is easily finished, requiring simple, low cost equipment for trimming, drilling, sanding, and painting.

Plastic is light. Large parts can be usually handled by one man without an overhead hoist. Simple fasteners reduce the time to remove or replace the parts. The material has sound-deadening qualities superior to those of metal and can be molded in one piece to close tolerances, with the required contour and color.

• **New Product Line**—The application of reinforced plastic housings on its machine tools has led Gisholt into a new product line. With several presses in its plastics department, the company is now turning out parts like plastic chair bases, containers, and appliance parts. Using heated dies, parts are molded in 1 to 2 minutes.

given for production, many thousands of parts may be turned out. A design specification requiring unnecessary or costly material can result in a waste of thousands of dollars over the life of the design.

A product design committed to one material does not have to remain bound to that material. Periodic review can pay off. The substitution of nonmetals for metals is as deserving of attention as the substitution of one metal for another.

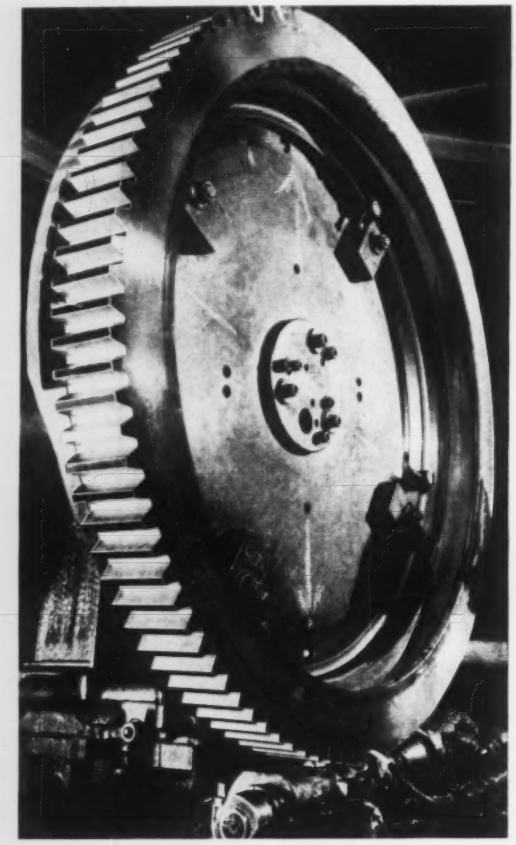
Gisholt Machine Co. is realizing tremendous savings through the use of plastic housings on its machine tools (see Page 84). Management found that it didn't need the strength of metals in the application.

• **Costs can be controlled in two basic areas: The material itself and in the fabrication stages.**

Function is the top consideration. "We buy functions at the lowest cost we can," says Norman B. Taylor, manager of the Value Analysis Section, Purchasing Dept., Motorola Inc., Chicago. Cost and ease of manufacture must play secondary roles until a material that will do the job is found.

Once function is resolved, other

Manufacturing Costs Cut By Selection of Material



One manufacturer using leaded steel forgings to produce large gears reports better than a 50 per cent time saving in roughing and finishing

THE product designer often can bring part costs down by selecting a material that can be easily shaped into a useful product without compromising functional properties.

Take machinability. Floor-to-floor costs on a machined part involved the operator's wage, tooling costs, and the cost of running the machine. Cutting 50 per cent off the time a part spends in the machine shop can trim a big hunk off its over-all cost.

Many gears, shafts, and other machine components are made from forgings because of the increased strength inherent in forged parts. But a forged steel part isn't always the easiest material to machine. It can be though if it's made of leaded steel. The finely dispersed lead particles increase tool life tremendously. The decrease in mechanical and physical properties of the material is not significant.

• **Case Histories**—Warner & Swasey Co., Cleveland, reduced the time for straddle-mill dovetailing on the end of a shaft 71 per cent by using Hi-Qua-Led steel forgings made by Alco Products Inc., Schenectady, N. Y. Including milling, turning, and trepanning, the over-all machining time for the piece was 33 per cent under that needed with regular steel.

A gear cutter formerly spent $180 on tools for each gear. When he switched to leaded steel forgings, tool costs dropped to $30 per gear.

In another application, a boring mill operation that required 3 hours 24 minutes with regular steel is now off the machine in 43 minutes. The number of pieces per tool grind has been increased from three to ten.

Leaded steels usually give a smoother surface finish. A gear manufacturer reports a 47 per cent decrease in machining time and, elimination of burrs which require extensive hand filing.

• **Advantages** — Tool-life increases with leaded steel forgings have been reported as high as 1600 per cent. In four cases, the average boost in tool life was 340 per cent. Savings in machining time, in five cases, averaged 59 per cent.

In controlled laboratory tests at Alco Products, the 41L40 grade gave 17 times the tool life of standard 4140, and 10L45 gave 100 times better tool life than regular 1045 at the same speeds and rates of feed.

cost contributing factors must be considered. When several materials are available, comparative costs and methods of manufacture come into play.

"At Motorola, we look for materials that will lend themselves to mechanized processing," relates Mr. Taylor.

Bearing Co. of America, Lancaster, Pa., is saving $2351 annually because of a switch in materials used for work rest plates on centerless grinders. When the plates wore out, they were being replaced with a carbide-tipped plate at considerable cost.

The plates are now made of cold-rolled steel with a wear edge built up with a hard surfacing material. The blade is trimmed to size on a grinder. All work is done in the company's toolroom. Frank H. Tapasto, methods improvement coordinator, estimates that 45 work rest plates are repaired annually at a saving of about 83 per cent.

• **Generalizations about selection can be misleading.**

It is easy to select the most economical basic material when considering cost alone. Hot-rolled strip steel is selling for 5.1 cents a pound in Pittsburgh. Titanium strip costs about $9.60 a pound. But the price differential can be justified when the higher priced materal results in better performance and longer product life.

Several 2 in. globe valves of a stainless alloy and one of titanium were tested in a 65 per cent nitric acid solution at 230° F. The stainless valves cost $102 each; the titanium valve cost $380. The stainless valve failed in less than six months (some lasted only three months). The titanium valve is expected to last ten years. Although the titanium valve cost $278 more, it will pay for itself in less than a year and a half. In ten years, it will have saved more than $1750 in replacement costs.

• Be alert to long range price trends in basic materials.

The cost of materials is always changing. Use of some of the newer materials could price a product out of the market. But in a few years, the materials may be entirely feasible from a cost standpoint.

Titanium sheets cost $25 a pound in 1951 vs. $9.60 today. Billets used to be $20 a pound. Today, they're $4.30. Magnesium is another metal that has shown some sharp reductions in price with technological improvements. Ingots of the light metal cost $1.81 a pound in 1918. Now you can buy them for 36 cents a pound. And you can expect the price of the metal to keep coming down as production methods are improved and applications expand.

In other cases, the relative price stability of a material, such as aluminum, may make it attractive to a fabricator when compared with a material being used that may have highly fluctuating costs.

Aluminum's good machinability, weldability, and corrosion resistance could make it attractive even before price equality with a presently used material is reached.

• Ease of producibility can play a key role in lowering material costs.

Say the final decision boils down to a forged part that costs $1 a pound and a 10-cent-a-pound formed sheet. Manufacturing time may more than make up the cost differential in the two materials.

A small compromise can often result in drastic cost reductions. Although aluminum and magnesium alloys cost more than steel or its alloys for similar designs, the time required for machining the lightweight alloys may be sufficiently less to offset the difference in raw material cost.

Leaded steel bars and forgings cost slightly more than their standard counterparts. But users of leaded steels report reductions in machining time of more than 50 per cent, particularly in alloy grades, and increases in tool life of more than 300 per cent.

R. D. Halverstadt, consultant, Materials Services Dept., General Electric Co., New York, advises those responsible for specifying materials to "develop an empathy for the processing engineer. Put yourself in his place and try to design for production."

The Annual Survey of Manufacturers published by the U. S. Bureau of the Census shows that the cost of materials often accounts for more than half the value of shipments in metalworking manufacturing. With rising costs so much of a problem (the costs of materials used by metalworking have leaped nearly 70 per cent in the last ten years), proper material selection can be a big step toward beating the cost crisis.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Enter the Competition

Your entry may be a winner in STEEL's second annual Cost Crisis Awards Competition. Tell us how your company beat the Cost Crisis through more efficient use of materials.

Four areas are being explored. Your entry may represent one, or a combination of them:

1. The substitution of a tailored shape for standard mill products, or vice versa.
2. The use of a standard purchased material instead of a special, or vice versa.
3. The standardization of two or more separate purchases into one.
4. The substitution of one alloy for another of the same basic material.

The result may be savings in material cost, or in the cost of manufacturing a product.

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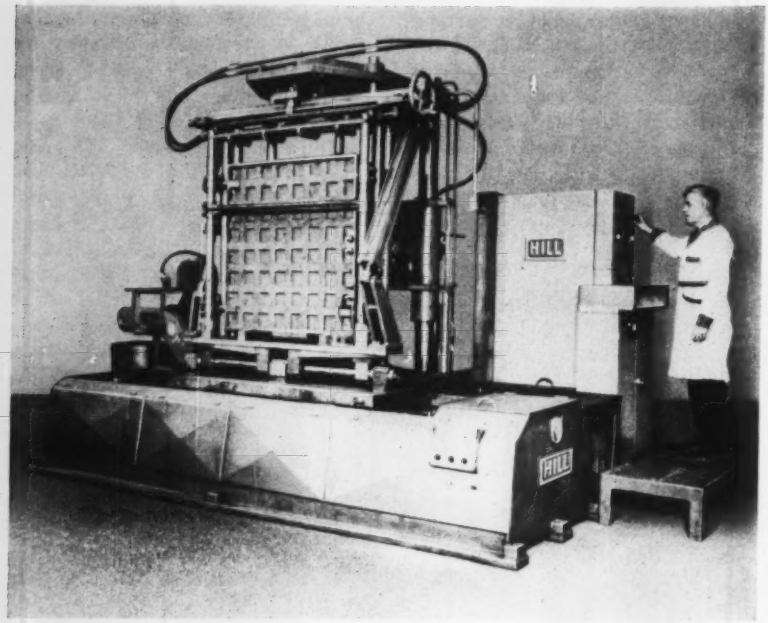
Cleveland 13, Ohio



Tape Control Machine Can Drill, Mill, Jig Bore

A HIGH SPEED, numerically controlled drilling and boring machine can drill a series of holes through 4 in. of SAE 1020 steel at speeds up to 30 ipm. The maker is Walter P. Hill Inc., Detroit.

Holes can be patterned within 0.050 in. of each other with no breakthroughs. If you want secondary operations, just switch tools and rerun the tape. Accuracy can be held to half a thousandth. Best of all, the cost (around $50,000) is less than that of similar machines without tape controls.

• **It's Fast**—Modified conventional tools may be used. Secret of the machine's high speed comes from a spindle thrust of 16,000 lb, developed by a pair of 3¼ in. diameter hydraulic cylinders. The 4 in. spindle travels in a honed Meehanite sleeve. It's driven by a 15 hp motor operating through a variable speed drive. Spindle travel is 12 in., and linear spindle accuracy of ±0.0005 in. is provided by the tape programing system.

Hill's first machine is going to General Electric Co., Schenectady, N. Y., to produce a variety of power-plant electric generator cooling sections and components. General Motors' Technical Center has ordered another. It seems to be a natural for milling, drilling, jig boring, and reaming, as well as nonfixtured, small lot jobs requiring secondary operations in a variety of locations. It should be ideal for tool and die and prototype manufacturing.

• **Accurate**—Quick, positive accuracy is important. Low horsepower electric motors are used to eliminate servovalves. This also helps reduce cost, says the manufacturer. Three independent hydraulic systems are provided. One is used for the table drive. The second raises and lowers the head. A third provides drill feed and table tilt.

The table has a 25 ton capacity. A ball bearing lead screw attached to the table is connected to the numerically controlled positioning motor through a worm gear speed reducer. The lead screw is also directly connected to a Selsyn pick-up director unit. A hydraulic cylinder, held under pressure, prevents backlash and moves the table.

• **And Automatic**—Hill uses GE's Mark II tape control unit. The table is positioned with a ¾ hp, direct current positioning motor. This motion releases the lead screw, and the hydraulic cylinder moves the table. When the table is located, the motor is shut off, locking the lead screw. The Selsyn pickup checks table position. If it's not right, the machine automatically corrects the error, or the motor shuts off if it can't be corrected.

A similar indexing system raises and lowers the 4600 lb spindle head which travels on round columns. When the machine is seeking a given hole position under tape control, both table and head travel take place simultaneously. Automatic overload protection is provided.

All hydraulic power units are enclosed in the machine's welded steel base. A motorized conveyor carries chips out of the working area. The T-slot table is about 4 ft square. Table and head travel for positioning is done at a rate of 84 in. per minute. Total index travel of both head and table is 4 ft.

Titanium Toughened

Titanium's applications have been widened by adding palladium, says Union Carbide Metals Co., a division of Union Carbide Corp., New York.

As little as 0.1 per cent palladium alloyed with titanium makes it resistant to boiling solutions of reducing acids without impairing titanium's resistance to oxidizing acids.

The tests also showed that small additions of other noble metals (such as platinum, rhenium, or ruthenium) could achieve the same results.

Mechanical properties are identical to the unalloyed titanium. Additions up to 0.2 per cent have no effect on the tensile properties (including strength and ductility). It can also be cold and hot worked without difficulty.

Processing equipment fabricators will soon be able to get the alloy. Union Carbide plans licensing.

Ultrasonics Detects Faulty Bonding

Bridgeport Brass uses method to test laminated kitchenware. It's reliable, cuts scrap losses

An ultrasonic gage is saving hundreds of dollars by providing a simple, fast, and reliable nondestructive test method for Bridgeport Brass Co., Bridgeport, Conn.

Bridgeport Brass manufactures rim-to-rim laminated kitchenware. An inner copper core, used for its excellent heat conduction, is protected by two outer stainless steel skins which retain heat and provide bright and easy to clean surfaces.

Bond discontinuities in the blanks mean scrap. Blanks with an imperfect bond will delaminate during drawing or develop streaks or blisters.

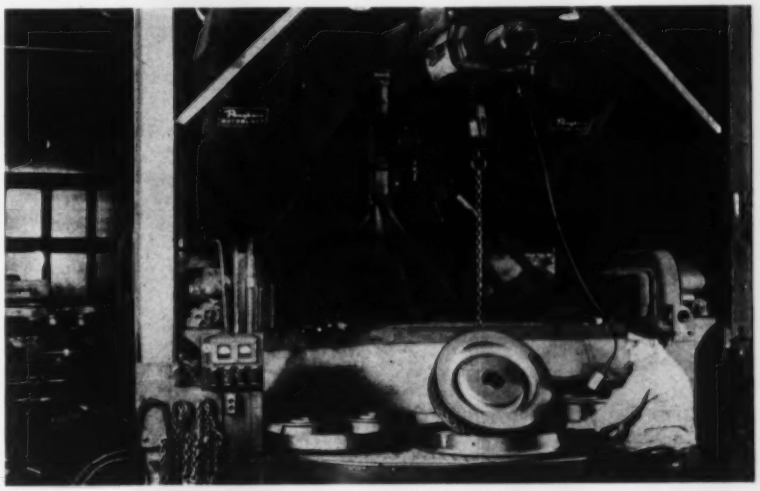
Three years ago, Bridgeport Brass installed an ultrasonic tester (Model 14 Vidigage) made by Branson Instruments Inc., Stamford, Conn. Scrap losses due to faulty bonding were reduced.

• **Test Method**—Each blank to be tested is coated with a thin film of oil or glycerin for good sonic energy transmission. Then a quartz transducer is held to the laminated blank. A crystal, excited by an electronic sweep oscillator, vibrates over a range of frequencies, transmitting continuously varying ultrasonic waves into the material.

At equal or multiple frequencies of the natural resonant frequency of the metal thickness, vibration amplitude increases. This is indicated by a series of vertical lines on the cathode ray tube.

Internal discontinuities appear on the screen as an incomplete trace, an absence of traces, or a difference in spacing. Access to one side only is required. The material is not harmed or marked.

Only one operator is required to handle random production testing. Operators can quickly learn to read the 14 in. cathode ray screen. The unit weighs 60 lb.



This blast cleaning table is controlled from the pushbutton panel at left. The electric hoist facilitates loading of the heavy gears and wheels

Blast Cleaning Table Reduces Manhour Needs

Work that formerly took three shifts is now done in one. Appearance, machinability, and tool life improved; subsequent processes are speeded up

IF YOUR PRODUCTION process includes air blast cleaning, here's a way to cut costs. Tool Steel Gear & Pinion Co., Cincinnati, reduced manhour requirements two-thirds by installing a blast cleaning table.

Other benefits: Improved product appearance and machinability, increased tool life, and a speedup of subsequent processes.

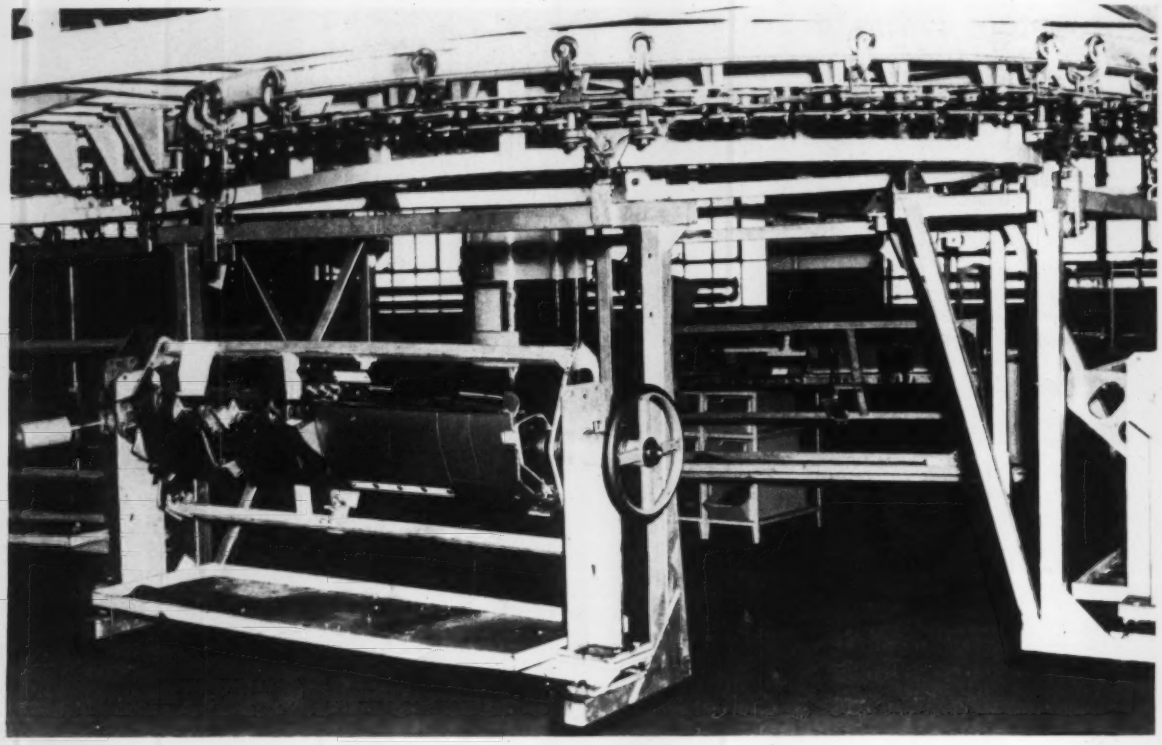
The company manufactures high quality, heat treated gears and pinions made of plain carbon and alloy steel. It also makes steel mill rolls, heavy duty crane wheels, driveshafts, clutches, plungers, sprockets, bearings, and couplings.

The firm is carburizing 1.5 million lb of steel per month. Two-thirds requires cleaning. Before installation of the new equipment (made by Pangborn Corp., Hagerstown, Md.) an air blast room was working three shifts to remove iron oxide scale from a day's production of heat treated forgings.

The 9 ft Rotoblast table (LG-14) exceeded expectations. It was anticipated that the job would take two shifts. So far, it's being done in one —about 39,500 lb of heat treated steel is cleaned during that period.

• **Equipment** — Two Rotoblast wheels, each powered by a 20 hp motor, throw 64,000 lb of abrasive per hour. Two self-contained automatic elevators and separators clean used abrasive for recirculation to the wheels.

Work is loaded onto the auxiliary rotating worktables with an electric hoist. The auxiliary units rotate independently of the table and make several complete revolutions in the Rotoblast area of the table. In the blast, the sides of the table housing are protected by wear plates. Pushbutton controls on the loading side of the table start, stop, and vary speed.



Monorail car, with compression loaded outrigger, holds work and fixture in front of the assembler and prevents it from vibrating or swinging

Monorail Conveyors Are Easy to Maintain

Overhead system with outriggers is more reliable than the one it replaced. Stock control is simplified; parts are held steadier while they're being put together. Other advantages: More efficient supervision and better housekeeping

THINKING about installing conveyors? The overhead monorail may be just what you're looking for. A good example is the system at Cadillac Motor Car Div., General Motors Corp., Dearborn, Mich.

Plant engineers at the Dearborn shop chose three hanging conveyors because of their reliability. The conveyors were built by Anchor Steel & Conveyor Co., Dearborn.

• The conveyors have simplified stock control. They've also brought about more efficient supervision and better housekeeping.

Because the new system is off the floor, it's easier to keep clean. It permits stocking of parts right on the line.

Work supervision is simplified; foremen can go from one side of the conveyor to the other without walking to the end of the line.

• Outriggers on conveyor cars permit work and loads to hang in front of the assembler.

Three monorail lines carry automobile bumpers and instrument panels while they're being assembled. Each part is held in a fixture and suspended from two vertical members. Tools are positioned in front of the workers to simplify assembly.

Anchor engineers designed an outrigger system to counterbalance the weight of work and the fixture, which extends outward from the monorail. It also keeps fixtures from swinging or vibrating.

Outriggers slant upward from the bottom of the main suspension members. They're loaded in compression, and ride against an outrigger rail.

• Reliable hanging cars cut costs by reducing downtime.

The system is more reliable than the one it replaced, Anchor engineers claim. One breakdown in a network of conveyors can cripple a large plant in a short time.

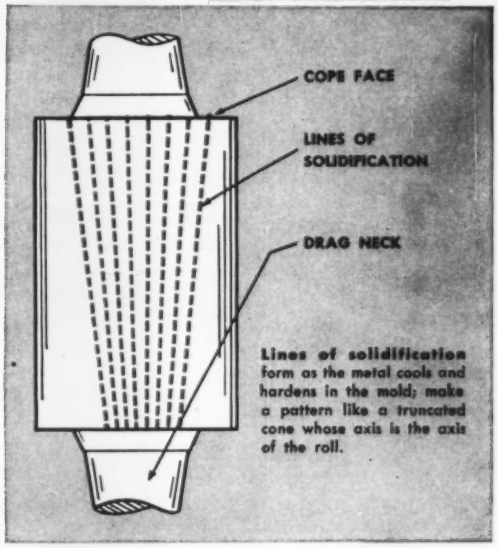
Jamming is almost eliminated with the monorail system. That permits more accurate production scheduling.

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

What we learn from "fingerprinting" a back-up roll


COPE FACE
LINES OF SOLIDIFICATION
DRAG NECK
Lines of solidification form as the metal cools and hardens in the mold; make a pattern like a truncated cone whose axis is the axis of the roll.

"Cope face spot depth" sounds a little mysterious, but actually it is a relatively simple, accurate guide to the future performance of back-up rolls in 4-high mills. Even more important, when the roll maker keeps sulfur print records of the spot depth on every back-up roll he ships, it is possible to relate the pattern of the print to the actual tonnage turned out by the roll, as reported by the customer. With this information at hand, Mack-Hemp metallurgists can modify the alloy "mix" or the foundry practice so that the next set of back-up rolls will give even better service.

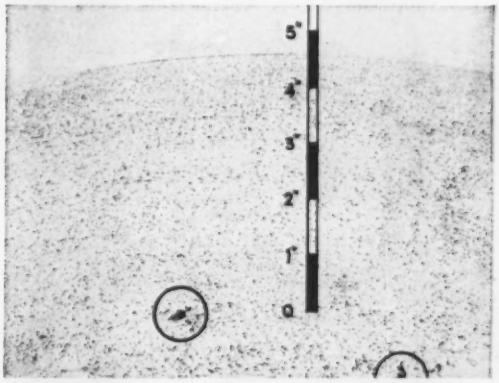
What "cope face spot depth" reveals—As a freshly-poured Mack-Hemp "Technalloy" or "Midland Superalloy" steel back-up roll cools and hardens, so-called "lines of solidification" form below the surface of the roll (see diagram). These lines arrange themselves in a cone-shaped pattern spreading outward as they ascend from the "drag" wabbler toward the upper shoulder of the roll body, or "cope face." The points where the lines of solidification end in the cope face can be detected by an acid etch, and a permanent record made by laying special photographic paper over the etched area.

As you can see, the depth of this zone of dense metal is shallowest at the cope face because of the way the lines angle outward. Hence, cope face spot depth provides a measure of the minimum amount of sound, homogeneous metal between these lines of solidification and the work surface of the roll.

Spots should be deep—In general, the roll maker's objective is to keep the spots on the cope face as deep as possible below the worn-out circumference of the roll. However, sheer depth is not the only indication of the roll's life expectancy and behavior in service. The arrangement and density of the spots also tell their story to the trained metallurgist, particularly when he studies them in the light of performance data from the customer and foundry practice at Mack-Hemp.

* * *

You can see why it's a good idea to keep careful records of tonnages rolled by your Mack-Hemp hot and cold mill back-up rolls. It's a good idea, too, to consult Mack-Hemp on any and all your problems of roll use and selection whenever they arise. Feel free to call or write us at any time.



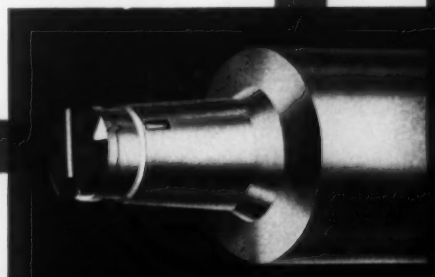
Sulfur print of "Superalloy" back-up roll. Two spots are clearly evident at the bottom of the print (½ actual size).

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

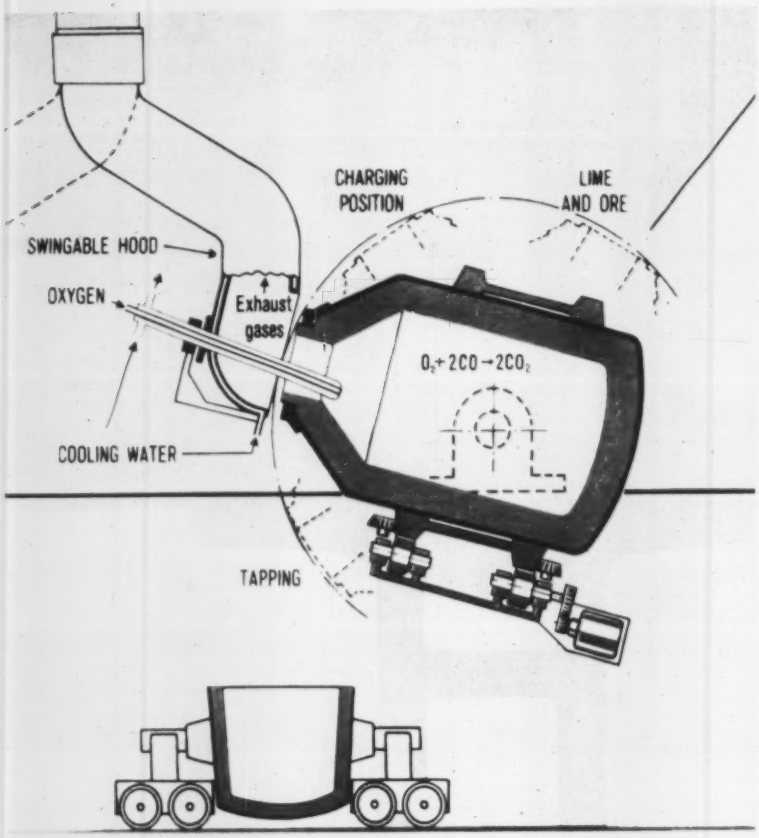
Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



Dravo Gets American Rights To Swedish Steel Process

Rotating oxygen converter turns out high quality steel; heat efficiency and output are high, and capital outlay is less than for an open hearth of the same capacity



The furnace is mounted on wheels in a cradle that can be tilted to the right positions for addition of lime and ore, charging, blowing, or tapping

PLANT design, construction, and marketing rights for a Swedish oxygen steelmaking process have been acquired by Dravo Corp., Pittsburgh, a supplier of equipment and services for the steel industry. Dravo's territory: The U. S. and Canada.

The Stora-Kaldo process, developed by Stora Kopperbergs Berslags Aktiebolog, Stockholm, reduces pig iron to steel, using an inclined, variable speed, rotating furnace.

• Capital outlay is said to be less than that for an open hearth shop of the same capacity.

Operation at the Swedish company's Domnarvet works, near Stockholm, indicates that a plant in the U. S. or Canada will cost 50 to 75 per cent less than a comparable open hearth shop. A plant turning out 1 million tons annually, using present buildings and auxiliaries, would cost about $8 million.

Plant designs, heat and material balances, and cost estimates have been completed for several installations in this country.

• The tilted, rotating furnace has the shape of a bessemer converter.

The 30 ton furnace at Domnarvet is a rotating vessel with two running rings, mounted on wheels in a cradle that can be tilted on trunnions.

It rotates as fast as 30 rpm, inclined at 17 degrees so the melt covers at least half of the backwall. That keeps the lining in contact with the bath during rotation, and prevents overheating when carbon monoxide, formed during the reaction, is burned by lance oxygen. It also increases the effective furnace volume for more rapid refining.

Variable speed permits control of iron content, slag viscosity, and the general run of the heat. Increasing the speed reduces iron oxide content of the slag, making it viscous, or dry, so it can be removed selectively.

Oxygen, at about 45 psi, is supplied by a water cooled lance, attached to the exhaust hood and inserted about 3 ft into the furnace. The gas is blown against the bath at a shallow angle, to prevent splashing.

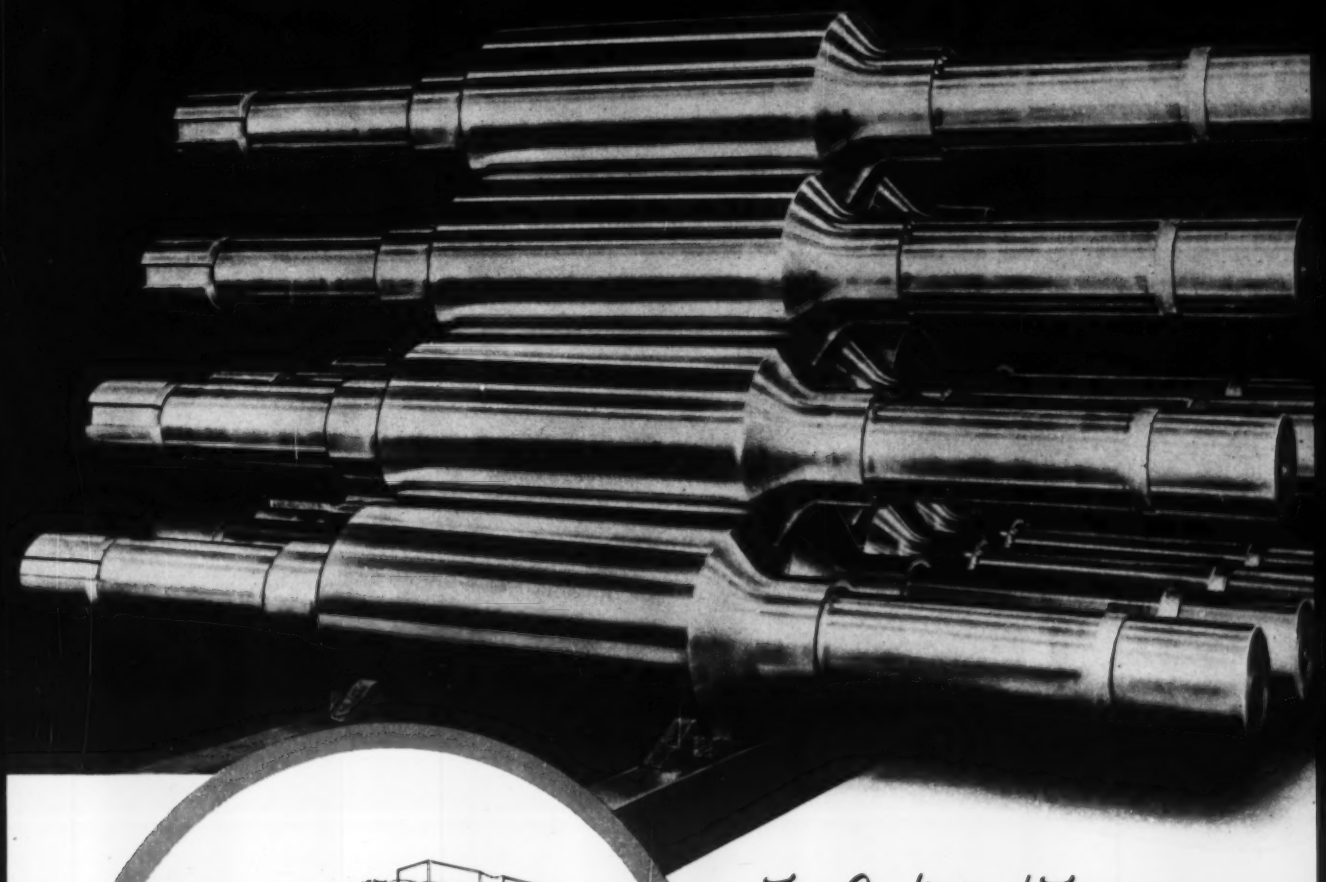
Permanent lining of the Domnarvet furnace consists of 2 in. fire bricks, laid against the shell, and 4½ in. burned magnesite bricks. Working lining: 14 in. tar dolomite bricks, separated from the permanent lining by a 2 in. layer of tar-dolomite ramming material.

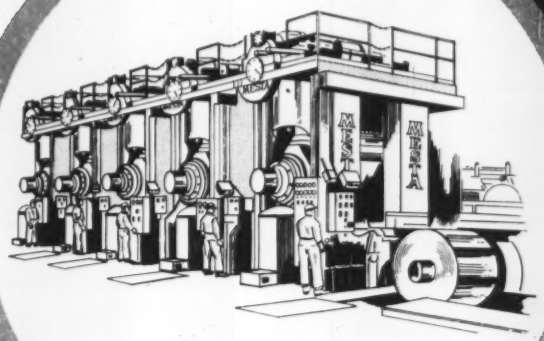
Lining life of 65 heats, acceptable in Sweden, can be increased in America with better lining material, better brickmaking, and better brick laying, Dravo says. Lower slag volume, possible with American ores, should increase lining life.

• The furnace can be used to refine high or low phosphorous ores.

Designed to refine high phosphorous Swedish ore, it's adaptable

MESTA ROLLS





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Photos, courtesy Nicro Division of The Cory Corporation, Chicago.

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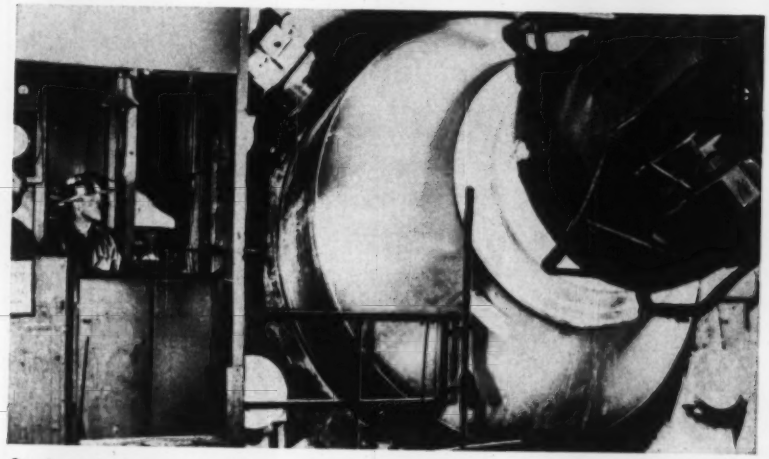


Steel and slag composition are easy to control in the tilted, rotating vessel

Exhaust hood and oxygen lance are removed for observation of the molten metal

to low phosphorous American iron.

In refining basic bessemer high phosphorous iron, it's desirable to reduce carbon content to 1 or 2 per cent before most of the phosphorus is oxidized. The vessel is rotated at full speed during the first part of the blow, to delay melting of the slag. Speed is then reduced to create a liquid slag and reverse the relative rates of decarburization and dephosphorization. The furnace is rotated faster near the end of the blow, to reduce iron oxide in the slag and oxygen in the steel.

Temperature in the exhaust stack indicates whether carbon and other nonmetals are oxidizing. It also shows intensity of the carbon boil. With oxygen input held constant, a strong boil produces more carbon monoxide in the exhaust gases. It burns in the exhaust hood, raising the temperature in the gas flue. Slower rotation reduces the carbon boil and flue temperature.

In refining low phosphorous iron of the open hearth type (common in North America), lime is added at the start of the blow to reduce basicity of the slag, after most of the silicon is oxidized. The slag is fluid at 2700° F and has a low iron content. Because it's easy to reach equilibrium between steel and slag, iron content in the slag can be reduced to as little as 2 per cent. After slag removal, more lime and ore, sinter, or scrap are added, and carbon is brought down.

The first slag isn't basic enough to bind phosphorus and sulfur. The bath can be dephosphorized and desulfurized by adding lime and ore after the silica slag has been tapped. The slag doesn't have to be completely melted to bind the phosphorus. About 75 per cent of the final slag, containing 15 per cent iron, can be re-used.

• The process uses low grade ore for cooling, and burns most of the carbon monoxide generated in the bath. Steel yield is high.

Ore used for cooling doesn't have to be the high grade used in open hearths and electrics. Sinter fines smaller than ¾ in., containing about 55 per cent iron and 7.5 per cent silicon dioxide, are suitable. Scrap can be used instead of ore; then only one slag is needed.

Most of the carbon dioxide created during the heat is burned in the furnace, generating additional heat for melting. Rotation of the vessel transfers the heat to the bath, permitting addition of ore, sinter, or scrap to increase steel output. Lime, used to form slag, also boosts production by reducing ore.

When ore is used for cooling instead of scrap, more hot metal is used in the charge. Some of the oxygen needed to remove impurities is supplied by the ore. For each ton of pig iron refined, at least the same amount of ore can be used vs. 1100 to 1600 lb of scrap.

Steel output at Domnarvet is about 19 tons per hour; the furnace is tapped every 90 minutes (blowing time, about 40 minutes). Low phosphorous American iron should increase output.

• The product compares favorably with open hearth steel, Dravo claims.

Oxygen content is at least as low as for open hearth steel. It's easy to control deoxidation in making semikilled steels, using the same amounts of ladle additions from one heat to another.

Phosphorous content can be kept at 0.020 per cent or less in low carbon rimming steel for deep drawing. It can be held to 0.030 per cent in high carbon killed steel, made from pig iron containing 1.8 per cent phosphorus.

Nitrogen varies from 0.002 to 0.003 per cent when lance oxygen is 95 to 96 per cent pure; it can be as low as 0.001 per cent when the oxygen is 99 per cent pure. Low nitrogen makes the steel suitable for deep drawing sheets and wire. Low sulfur content gives the product good hot working and welding characteristics.

Dimensional Control Department at D-J. At D-J dimensional control of die cast parts is so much a part of production routine that a special department is devoted to this purpose. In rooms like this, at every D-J plant, experts verify the dimensions on die castings pulled periodically from the production line.

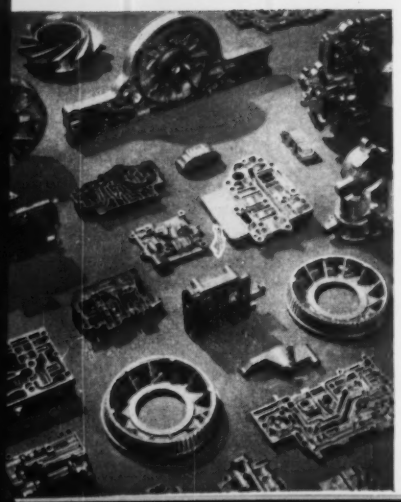
Outboard motor housing

Instrument panel bezel

Single cylinder engine block

Pinspotter part

At Doehler-Jarvis . . . everything improved production methods



Automatic transmission parts illustrate how much can be done with die cast design. Notice the ganged fluid passageways. Not apparent, but incorporated into the design of each of these parts, are many features that make these parts usable much as they are . . . with a minimum of further manufacturing needed.

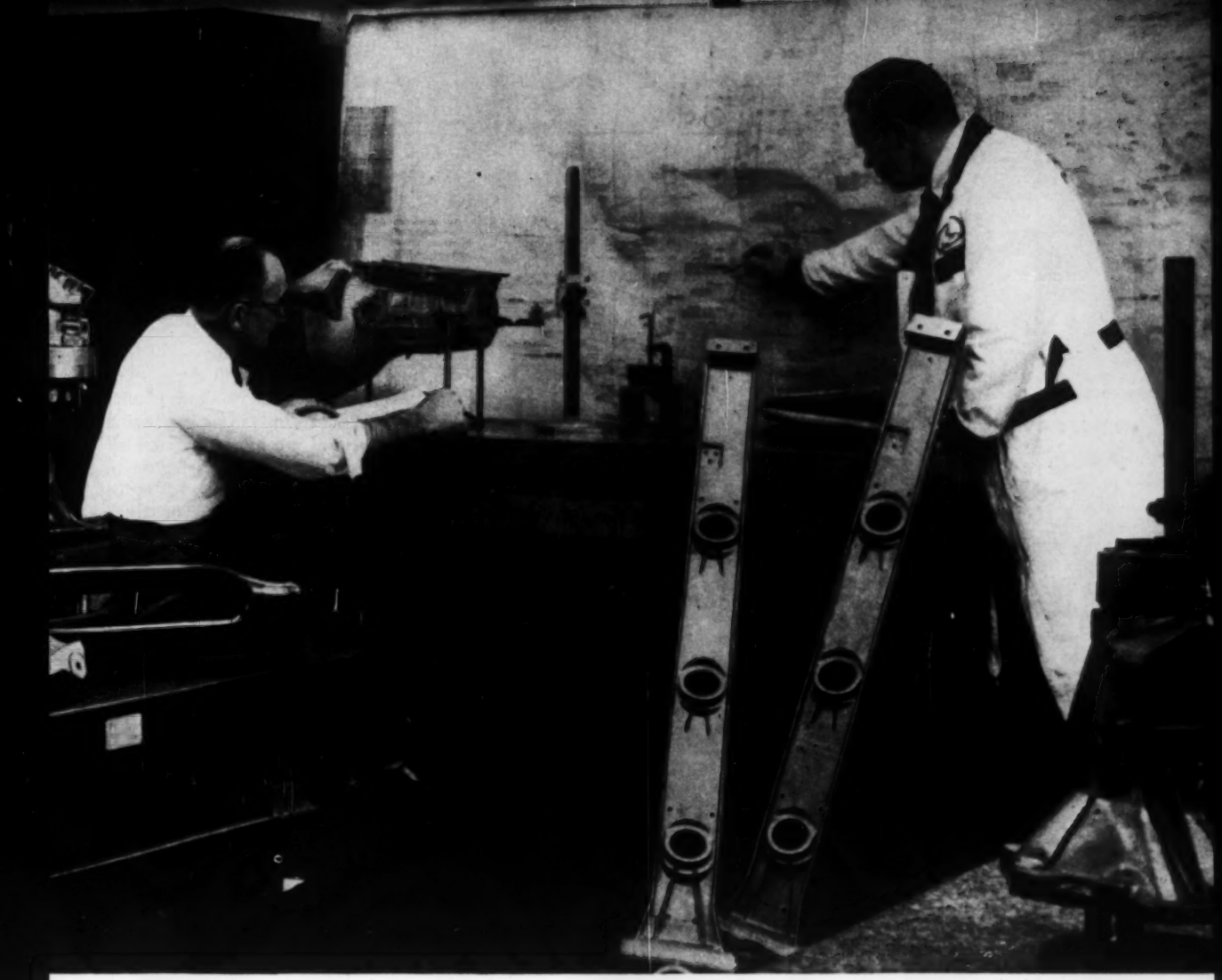
Only a handful of companies have ever taken *full* manufacturing advantage of the inherent opportunities presented by the purchase of die castings — opportunities to so design parts that production *all along the line* is simplified, speeded up, and made more economical.

Frequently die castings are bought under conditions where price is the dominant competitive factor. This approach sometimes makes good purchasing sense. And on the basis of price competition Doehler-Jarvis produces and sells more die castings per year than any other custom die caster.

But there is another, and often more rewarding, way to look at the purchase of die cast parts.

In many instances — most, in fact — a careful analysis of the part by experienced metal production men working in close coordination with equally experienced designers of the dies and the castings reveals ways to:

(1) reduce cost or improve performance of the casting itself.



Transmission housing | Pinspotter arms | Transmission part

needed to help you develop with the help of die castings

(2) introduce design features that eliminate one, many, or all of the machining, finishing or sub-assembling operations that must be accomplished before the part can be incorporated into the end product.

For example. Product engineers have only begun to realize the full range of applications made possible by the high fatigue strength inherent in aluminum die castings . . . by integrating several separate parts into one die casting . . . by ganging fluid passageways (as in automatic transmission designs).

Doehler-Jarvis customers who have taken this suggested broad viewpoint in purchasing their die castings find it pays off . . . sometimes enormously.

No producer of die castings can contribute more to this broad purchasing concept than Doehler-Jarvis.

In any category you care to name . . . research support . . . design help . . . skilled workmanship . . . versatility of metal working equipment (you can even buy *forgings, extrusions and stampings* from D-J) . . . sub-assembly facilities . . . choice of die casting metals and alloys . . . location of plants . . . delivery . . . Doehler-Jarvis provides more facilities than any other producer of die castings.

See what Doehler-Jarvis can do to help you realize the full potentials in die cast parts production. Call us in at an early stage in the design of your next new product or model change.

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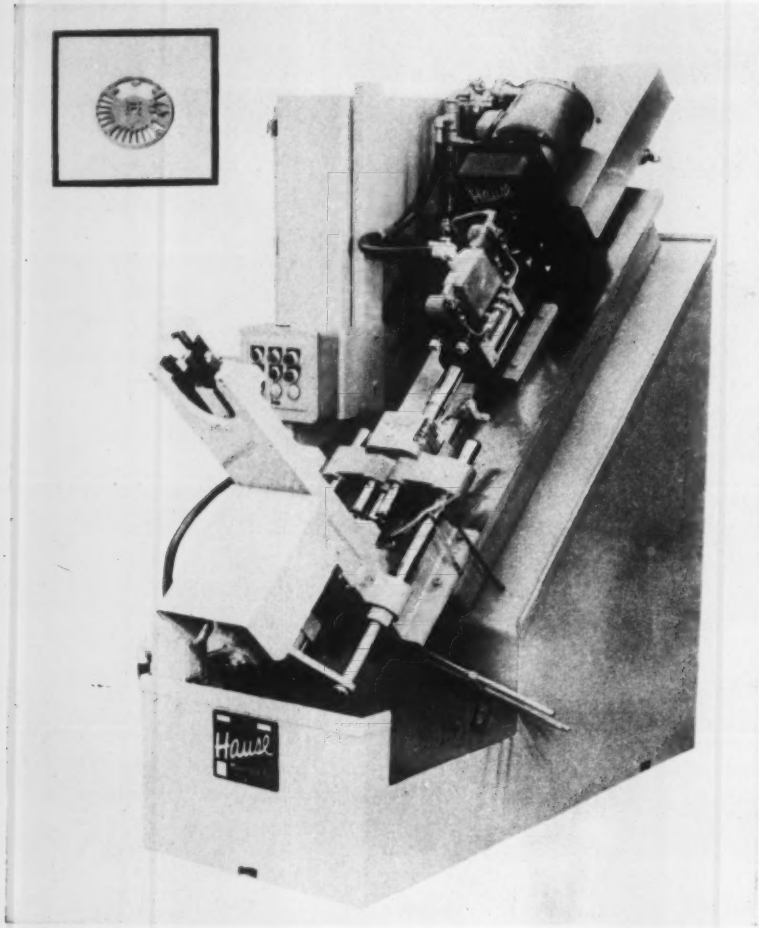


Three holes are drilled and tapped simultaneously in the aluminum part (inset). Parts are gravity fed to fixture under drill head. Completed parts drop automatically to chute at lower right

Machine Drills, Taps in One Stroke

DRILL and tap in a single stroke. That can be done with equipment developed by Hause Machines Inc., Montpelier, Ohio.

A major producer of electric motors uses the machine to drill and tap three 10-32 holes in 5/16 in. aluminum diecastings. (They receive screws which fasten a water pump to the motor end plate.)

Production rate: 600 parts an hour. Tool life is 5000 holes. Thread forms are said to be excellent.

• **Automatic Features** — The machine has a Holomatic drill unit which has a special lead screw attachment. A control arrangement allows rapid travel of the tools to the work surface, a hydraulically controlled feed during the drilling portion of the stroke. A lead screw controls tapping. The electric motor drive is reversed to withdraw the tap.

Two feed rates are made possible by a two member, telescoping spindle. Stroking rate of one member is tied in with the hydraulic system. A lead screw and nut operate the other. Engagement between lead screw and nut are controlled by air operated collets.

• **Design Aids Loading**—The fixture is mounted at 45 degrees for easier loading and to allow gravity feed. Parts drop into machining position and are released by an air operated rocker arm escapement. Released parts roll out a side discharge chute onto a conveyor which carries them to the next operation.

At first, combination drill-tap tools were made by grinding drill points and bodies on standard, two flute, straight taps. Drill body length was slightly longer than the thickness of the drilled material. Currently, the motormaker is employing a specially designed tool made from solid stock. The firm is said to get equal results with each style.

Standby Electric Plant Protects Laboratory Tests

Sustained high temperature tests (up to 10,000 hours at 2200° F) are protected from interruption by a standby 35,000 watt electric plant at Joliet Metallurgical Testing Laboratories Inc., Joliet, Ill. The firm uses 50 test stands to conduct high temperature creep and stress rupture evaluations of materials used by the Department of Defense.

Materials are heated as high as 2200° F in resistance wound furnaces. Loads are then applied to the metallic materials and tests are carried on for as long as 10,000 hours.

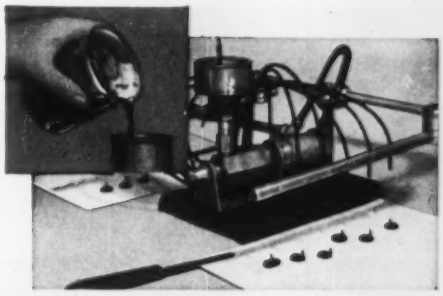
The standby plant was installed with a line transfer control (both from D. W. Onan & Sons Inc., Minneapolis) to insure automatic starting of the engine driven unit when power is interrupted.

A power line failure gave the laboratories a chance to see what the unit would do. No variation in furnace temperature was noted.

Bertsch & Co. finds solution to lubrication problem...with Standard Oil's

RYKON Grease R

Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging



Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversably converts fluid to a grease. Grease is ejected from outlet lines.

Problem: Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems.

What was done: Bertsch turned to Standard Oil for help. Standard Oil man, D. M. Simmons had the answer: RYKON Grease R. This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. RYKON Grease R flows to the pump as a fluid, lubricates the bearings as a grease.

What you can do: Maybe you manufacture equipment that needs a centralized lubrication system and you have been lookin for a grease like RYKON R. Get the facts about RYKON Grease R from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

Sons of founder, Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has seven years service with Standard. He has completed the Standard Oil Sales Engineering School.

Optical Gages Insure Accuracy Of Steam Turbine Blades

Contour projector, in the production area of the turbine blade shop, permits workers to check gages for accuracy while they're being made

By M. P. ROBINSON
Div. Staff Supervisor, Quality Control
Westinghouse Electric Corp., Steam Div.
Lester, Pa.

WHEN you turn out irregularly shaped parts like turbine blades, it's not enough to know when dimensions are incorrect. The critical factors are "how much" and "where" dimensions are off, so they can be corrected.

We make more than 1000 types of turbine blades. They range in length from ½ in. to the 44 in. giants created for the Philadelphia Electric 325,000 kw turbine at Eddystone, Pa. Each blade goes through 20 to 30 production steps; several gages are required for each step.

The problems in making and maintaining that variety of gages are big ones (tolerances are often ±0.0002 in.). Our answer: Optical checking on Kodak Model 30 contour projectors.

• Most of the optical gaging is applied in making hardened steel gages used on the production line. Previous methods didn't reveal the degree of error.

Blades include warps, twists, and variations in thickness. No flat surface is available for starting a measurement.

Gages formerly used to measure

Contour projectors not only tell you when dimensions are wrong. They pinpoint and measure the error. They offer a quick, accurate check for irregular contours, like turbine blades and the gages used in making them. An image of the part is cast on a chart of the right contour, mounted on the projector screen

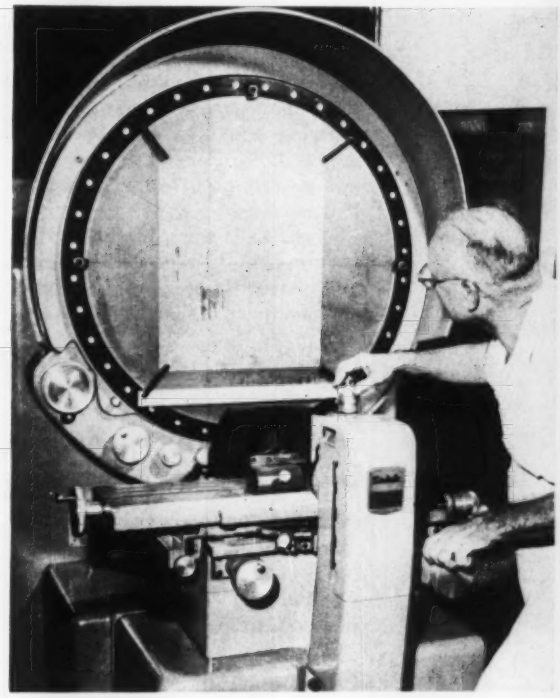
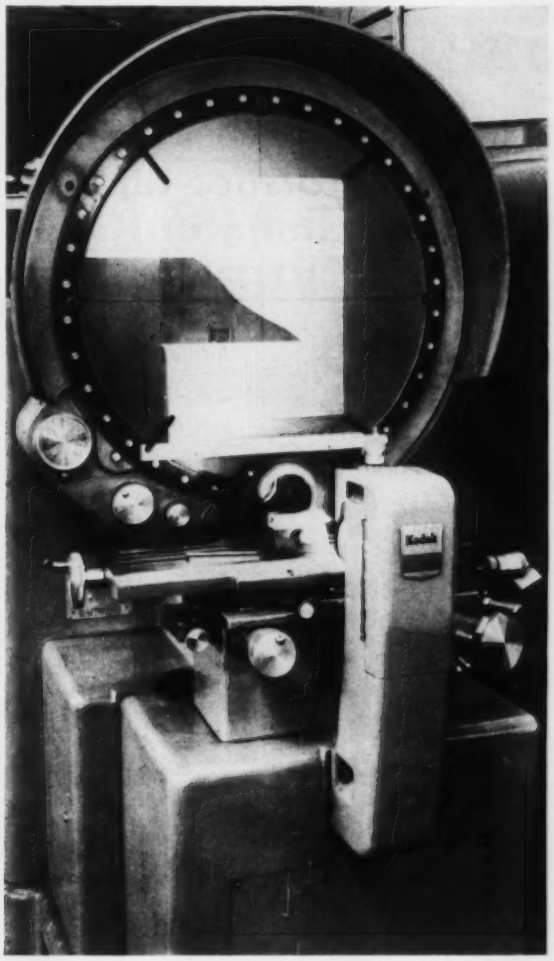


Image of the turbine blade gage, magnified ten times, is cast on a chart of the right contour



Gage on projector stage must conform to the outline on a chart mounted on the screen

contour during production were inspected on a light box that gave a 1:1 outline comparison. It indicated when the gage contour was off. But it didn't give an accurate definition of the contour or indicate the degree of error.

Measuring methods were improved when we installed four Kodak comparators in the blade shops. Two are for the gagemakers. One is for the grinders and inspectors. Another is for general use in the toolroom.

• Forged blades are checked with optical gages from the drawing board to the finished product.

To create a set of gages for blade production, a master gage is made from the engineering drawing, and a translucent chart, containing the exact dimensions of a blade section, is prepared. The chart, placed on the screen of the projector, is compared with the master gage. Later, the chart is used to measure the blade forging dies.

The master gage is used to make multiple copies—hardened steel production gages. Here again, gagemakers use the projectors repeatedly. It's a simple matter for them to test a gage they're working on by putting it in a holding device on the projector.

An image of the part is projected on the screen. It's compared with a chart that shows the precise contour required for the gage. Optical checking gives the gagemaker an immediate, accurate, and complete visual check on the progress he's making in shaping a gage.

• The method has a special payoff in the production of Christmas-tree type roots for blades.

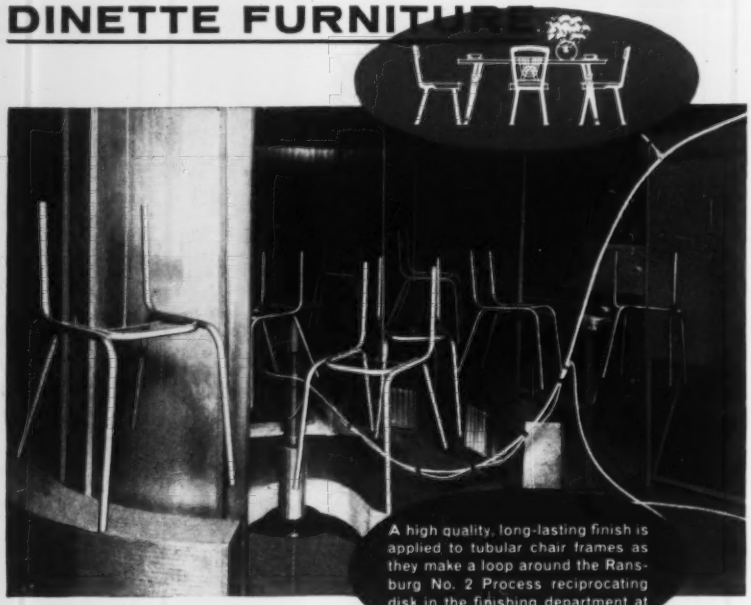
The name indicates the measuring difficulties. The serrated, triangular shape makes mechanical measurement all but impossible. We know of no practical way to make it without optical gaging.

The root of the blade is mounted on the projector, and its image is projected on the screen, where it's compared with a standard chart as shown in the above photo.

Production of the root can also be initiated by inserting a root coupon into a blank blade. The first root is serrated and checked on an optical comparator. When we're sure the machine is making the right shapes, we can make the roots in production quantities.

RANSBURG *Electro-Spray...*

PROVIDES 50% PAINT SAVING (over the former dip method) in the finishing of KAY-MAR DINETTE FURNITURE



A high quality, long-lasting finish is applied to tubular chair frames as they make a loop around the Ransburg No. 2 Process reciprocating disk in the finishing department at Kay-Mar Industries.

● Kay-Mar Industries, Cassopolis, Michigan, switched from the dip method to Ransburg Electrostatic Spray Painting because they wanted to improve the quality of the finish on their metal furniture line.

Now, with electrostatic spray painting, they get a heavier, more uniform application, which was not possible with former dip. With electrostatic, they are able to use metallic coatings with higher metal content. In their magazine advertising to the mobile home industry, they proudly say: "Finest finish in the industry at no additional cost to you!"

Electrostatic provides other advantages at Kay-Mar. They picked up some additional—and much needed—floor space when dip tanks were removed. Their insurance rates were reduced because of improved "housekeeping" conditions. Frequent color changes are made quickly and simply, and rejects—which used to run 1½%—are reduced to less than a quarter of one per cent.

NO REASON WHY YOU CAN'T DO IT, TOO!

Let us test prove the advantages of automatic electrostatic spray painting on your products in our complete laboratories. No obligation. Call or write for our No. 2 Process brochure, which shows a variety of automatic painting installations on a wide variety of products. Or, if your production doesn't justify automatic painting, let us tell you about the new Ransburg No. 2 Process electrostatic hand gun, now widely used by both large and small manufacturers.

RANSBURG

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

Work Drivers End Dogging, Boost Lathe Production

Work drivers are saving more than 20 seconds per piece in turning pump shafts, says Goulds Pumps Inc., Seneca Falls, N. Y. The drivers are mounted on LR automatic Lo-Swing lathes (both made by Seneca Falls Machine Co., Seneca Falls, N. Y.).

Only two different slides are needed to turn the full range of shaft diameters. Drivers are self-centering and save time by eliminating dogging. Angular serrated jaws provide positive quick grip on stock.

Seneca Falls work drivers may be used on any type of engine lathe, multiple tool lathe, or plain or universal grinder for work diameters of ½ to 6⅞ in.

Ceramic Bearing Material Resists Wear, Corrosion

A high strength glass-ceramic called Pyroceram has been introduced as a corrosion resistant bearing material by Corning Glass Works, Corning, N. Y.

The company says the bearings can be used with metal shafts at operational loads under highly corrosive conditions (hot acids can act as lubricants). Areas of use would include the chemical and food processing industries.

Sliding action tests indicate that Pyroceram has several advantages (including less friction, wear, and surface damage) when run against itself or against bearing metals.

Tests were run in ferric chloride, nitric acid, sodium hydroxide, molten lead, citric acid, hydrogen peroxide, and other materials. Stable hydrodynamic characteristics were maintained, and the material resisted tendencies to weld or score.

Use of Pyroceram as a ball bearing material and for seal gear, and other wear resistant applications is under evaluation.

Pyroceram was introduced in 1957 for missile radomes. The material starts out as glass. Under heat treatment, nucleating agents in the composition form centers of crystal growth, turning the material into a white, hard ceramic.

Machine Shears Light Gages Without Curling

A MINIMUM shear angle of 1-1/16 in. per foot is built into the new line of Verson hydraulic shears to eliminate curling of the sheared piece, especially when working with light gage materials.

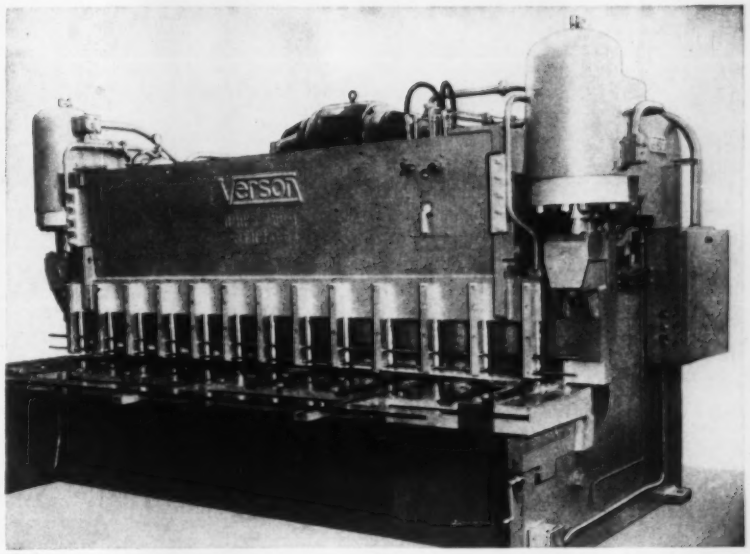
Capacities of standard models in the line range from 8 ft lengths of 3/8 in. mild steel through 12 ft lengths of 1½ in. mild steel. Special capacity machines are available.

All shears have automatic control to keep the ram operating at a predetermined shear angle. A handwheel at the operator's station provides angle adjustment.

Power operated back gages are controlled and operated from the front of the machine. Shears are also equipped with a front gage and a squaring arm for precise alignment of stock.

Ball transfers in the bed permit stock to be moved easily.

A stroke control has limit switches at top and bottom. It can be adjusted through the entire range of stroke. When narrow pieces are sheared, the stroke can be shortened.



For more information, *write* Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago 19, Ill.

Milling Machine Handles New Superalloys

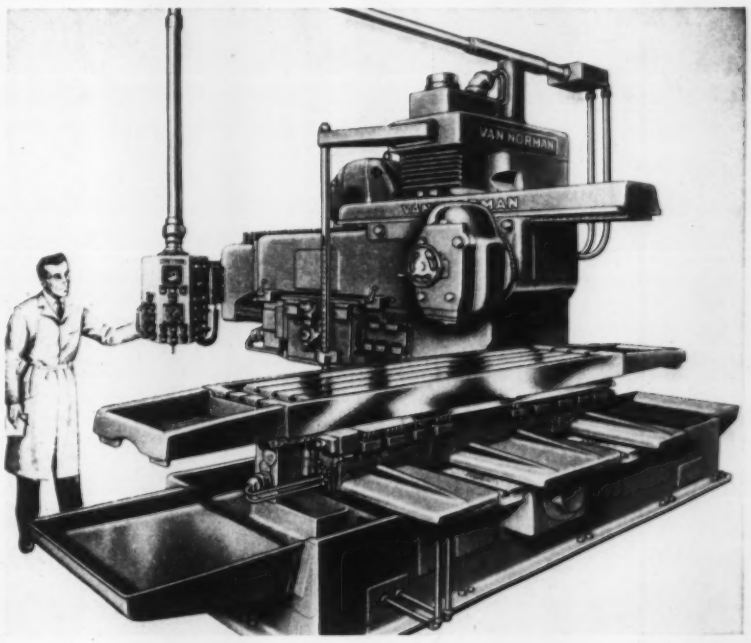
ENGINEERED for adaption of numerical control, the Van Norman No. 746 Versi-Matic milling machine has been designed to cut or shape the newer, tougher superalloys while maintaining exacting tolerances on big jobs.

All machine feeds are powered by hydraulic motors driving through gear boxes. Large diameter feed screws, mounted on preloaded, antifriction bearings, with recirculating ball nuts, permit accurate movement with zero backlash.

A swiveling cutter head greatly increases the scope of the machine. Horizontal, angular, and vertical milling operations can be performed with a minimum of changeover, tooling, and material handling time. Instant location of the cutter head is accomplished with positive stops and vernier readout.

The machine table is 96 in. long

(*Please turn to Page* 106)



To produce finest quality appliances

Richard Powell, general manager, and Stanley R. Burns, works manager, of Whirlpool's Clyde, Ohio, plant in the customer test booth where Whirlpool automatic washers are quality proved prior to delivery.

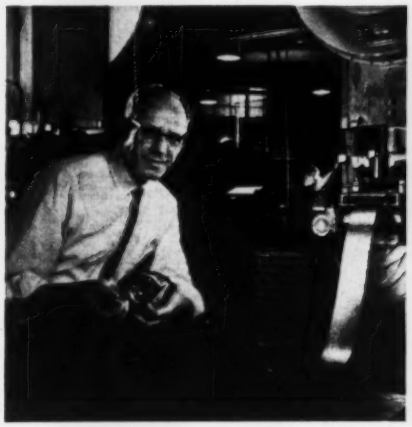
—Whirlpool begins with....

Quality Steels

The name Whirlpool has always symbolized quality in the appliance market. To assure continuance of this desired position the Whirlpool Corporation is careful to demand the finest quality materials from their suppliers.

Recently, Whirlpool's Clyde, Ohio, plant named the Sharon Steel Corporation as "Supplier of the Month" for two months in succession. We here at Sharon are proud of this commendation for it stands as tangible evidence that our desire to work with and provide our customers with the finest steels and service the industry has to offer has gained recognition in an industry where service and quality are important.

Sharon service is complete service and Sharon Steels are the finest made.
Sharon Steel Corporation, Sharon, Pa.



"To keep Whirlpool first line requires first line steels—Sharon does this consistently" —Lester First, Director of Quality Control of Whirlpool's Clyde, Ohio, plant.

"When you design for quality, the steel is important—for this reason Sharon has become a trusted supplier"—Albert Coleman, Director of Engineering.

Richard S. Rice, Director of Purchasing, presents Sharon salesman Myron Kauffman with his second in succession "Supplier of the Month" award as steel buyer Raymond Celek looks on.

SHARON *Quality* **STEEL**

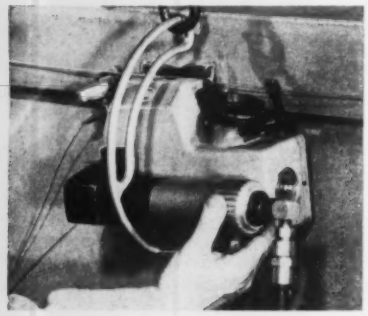
SHARONSTEEL

and 24 in. wide. Maximum clearance from spindle to table is 35 in., horizontal, and 22 in., vertical. The Versi-Matic also is available without a saddle in table lengths up to 130 in., and 30 in. wide.

For more information, *write* Van Norman Machine Co., Springfield 7, Mass.

Round Steel Strapper Is Powered, Portable

ROUND STEEL strapping can be tensioned, tied, and cut on virtually any size package if you use the Model 13 machine. Weighing only 20 lb, the air-powered unit can be held by the operator, or can be suspended from a simple counterbalancing mechanism.



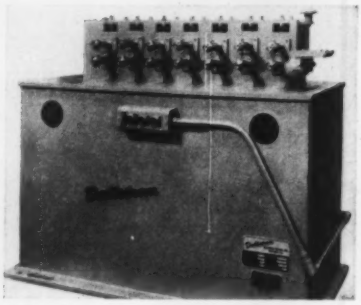
The strapping is used directly from a coil without special strap preparation. Uniform tension is applied automatically regardless of the size package or number of straps. Tension can be changed by a simple adjustment.

For more information, *write* U. S. Steel Supply Div., U. S. Steel Corp., 208 S. LaSalle St., Chicago 90, Ill.

Roll Forming Machine Handles Small Workpieces

DESIGNED to complement installed roll forming or production equipment, the Model 150 machine is especially practical for roll forming such work as moldings, weatherstripping, and curtain rods.

Welded steel construction is featured. The hardened and ground spindles are mounted on antifriction bearings. Rolls can be 2½ to 3¼ in. in diameter. The machine is available either as an open front type (illustrated), or the outboard type.



For more information, *write* Dahlstrom Machine Works Inc., 4227 W. Belmont Ave., Chicago 41, Ill.

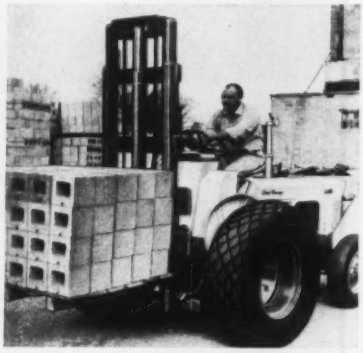
Speedy Lift Truck Cuts Handling Time

THE TOP 18 mph speed of the Model 310 utility fork lift truck cuts round trip time on long cycle work. The unit offers exceptional mobility for outdoor, or in-and-out handling of palletized, unitized, or bulky materials.

Big 13.00 x 24 diamond-tread or high-lug tires provide extra traction and flotation for work on pavement, rough ground, mud, or snow. The material handler is powered by a 42 hp, high torque gasoline engine.

The Model 310 lifts 4000 lb to 15 ft, 2500 to 21½ ft. Hydraulic power lifts, lowers, and tilts the mast backward and forward through a 12 to 20 degree range. The truck comes with a 48 in. fork. Optional 36, 42, or 28 in. concrete block forks are available.

Interchangeable concrete bucket, material bucket, and dozer blades meet specialized material handling needs or extend the work range for double duty service.



For more information, *write* Utility Sales Div., J. I. Case Co., Racine, Wis.

Multipurpose Lubricant

A HIGH film strength, lithium base product, Keystone No. 88 multipurpose lubricant can be applied in 90 per cent of all ball and roller bearing installations. It can also be used in plain bearings, needle bearings, and on rotating and sliding surfaces.

The lubricant is unaffected by short or long exposure to damp atmospheres or direct contact with water. It has powerful absorptive properties and is smooth, nonfibrous, homogeneous, and odorless.

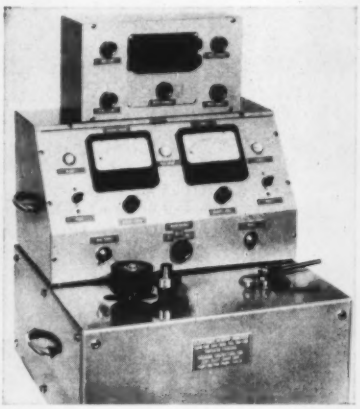
The material has an operating range of 0 to 275° F; it melts at about 400° F. It is made in six densities for a broad range of use.

For more information, *write* Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 32, Pa.

Bearing Analyzer Makes Serviceability Checks

UNSERVICEABLE bearings can be quickly and positively identified by an unskilled operator with the new Model BA-20 electronic bearing analyzer. Rejection of a bearing is indicated by a red light.

Checking of balls or rollers and all raceways can be completed in 30 seconds to 2 minutes. The user can set his own standards, or a standard rejection limit can be built



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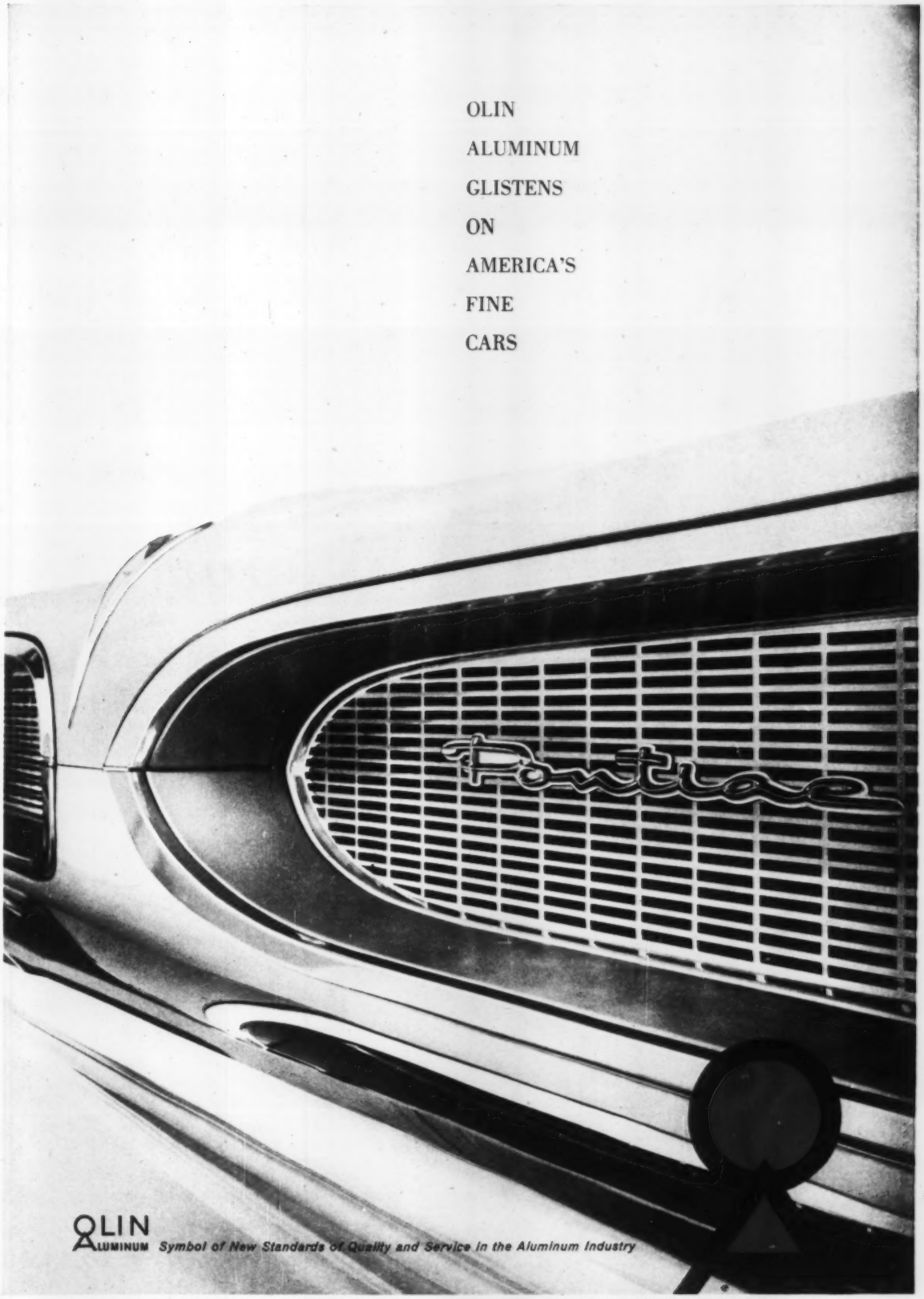
OLIN
ALUMINUM
GLISTENS
ON
AMERICA'S
FINE
CARS



OLIN ALUMINUM *Symbol of New Standards of Quality and Service in the Aluminum Industry*

METALS DIVISION, OLIN MATHIESON CHEMICAL CORPORATION, 400 PARK AVENUE, NEW YORK 22, N. Y.

You can't

bargain with safety!

Use a safe wire rope...use

CF&I-WICKWIRE

This giant steelman is the Image of CF&I—and of the many steel products produced by CF&I for every type of industrial use. He represents the quality controls that CF&I exercises during every step of manufacture—from ore to finished product.

Nowhere is this exacting attention to quality more rigorously followed than in the production of Wickwire Rope. That's because a quality rope is a safe rope. It helps the user eliminate losses due to injuries or wrecked equipment that can result when a "bargain" rope fails.

Wickwire Ropes are available in a complete range of sizes, constructions and grades—including Wickwire Double Gray *extra*-improved plow steel rope for your extra high strength rope requirements.

For safety's sake, use a quality wire rope . . . buy Wickwire.

WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N.M.) • Fort Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City • Phoenix Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans New York • Philadelphia

6631

into the instrument at the factory.

For more information, *write* Bearing Inspection Inc., 3311 E. Gage Ave., Huntington Park, Calif.

Direct Current Motors

FASTER response, a wider speed range, and higher overload capacity are features of a new line of Flexitorq motors. They are available in ratings of 1 to 200 hp, in dripproof and guarded enclosures.

The direct current motors are designed to supply constant or adjustable speed for driving machine tools; metal rolling, drawing, or forming machines; cranes; hoists; conveyors; and automated machinery.

For more information, *write* Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

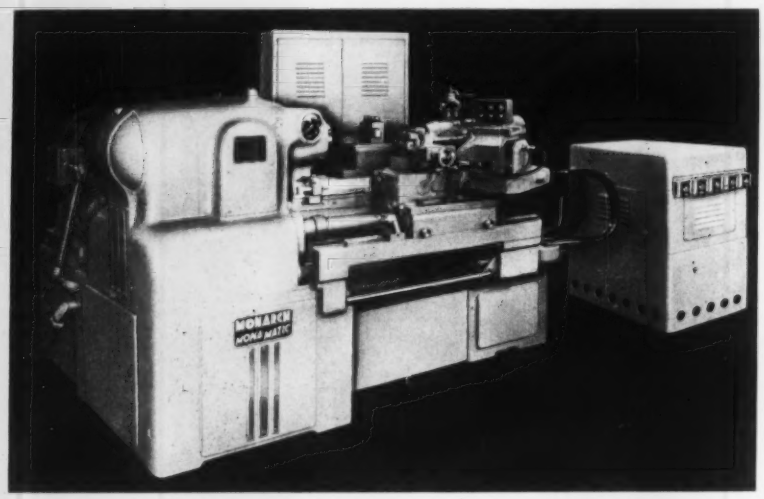
Magnetic Clutch Needs Almost No Maintenance

MACHINE TOOL transmissions can be reduced in size. Electro clutches provide more torque for their size than comparable units. They can be buried in a machine drive box or transmission and forgotten: There are no air gap adjustments to be made, no slip rings and brushes to be cleaned, adjusted, or replaced.

A closed flux path through hardened steel laminations incorporated in the new design eliminates the need for adjusting air gaps. Use of a stationary magnetic field (coil windings are on the stator instead of on the rotor) eliminates slip rings and brushes.

Although designed for the machine tool field to do such jobs as speed changing, feeding, and braking, the clutches are also applicable for machines doing such jobs as washing, packaging and strapping, and for conveying equipment. Five sizes with torque ratings ranging from 14 through 290 ft-lb are available.

For more information, *write* I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.



Production Lathe Cycles Automatically

A VARIETY of automatic cycling arrangements on the Model 20A Mona-Matic lathe provides high productivity and versatility.

The double carriage turning machine has an air gage, tracer controlled, front tool slide and hydraulically powered front carriage and rear slide.

A one or a two cut cycle can be furnished on the lathe. With the single cycle arrangement, four feeds are available to the carriage. On two cut lathes, one feed only may be used during the rough cut, the remaining three during the finish cut. Two cut cycle machines have a selector switch for one or two cut operations.

The machine is available in 18, 30, and 42 in. center distances. Swing over the bed is 15 in.; over front slide and rear slide ways, 8 in. Feed rates are 1 in. to 40 in. per minute.

A two speed main drive motor may be applied to the helical geared headstock equipped with power clutch and brake. Eight spindle speeds are available by pick-off gears in each of three standard ranges. The tailstock has an air actuated spindle and inbuilt, heavy duty, antifriction center.

The hydraulic power unit stands on the floor at the tailstock end of the machine. All cycle valving is manifold mounted. Compensated feed rate controllers at the front of the unit permit presetting of each feed for front carriage and rear slide.

For more information, *write* Monarch Machine Tool Co., Sidney, Ohio.

Unit Produces Vacuum In a Single Stroke

YOU CAN produce vacuums in die cavities, tanks, and other equipment with the new Velvac single stroke, double acting evacuator.

Faster than standard rotary type pump methods, the single stroke unit requires no reservoir tanks or accumulators, can be connected directly to the object to be evacuated, and requires connection only to the shop air line.

A single stroke of the unit will evacuate an 850 cu in. cavity or container to 20 in. of vacuum in one stroke, in about 1 second. The unit will be available in sizes and capacities for a wide range of applications. Strokes will be 6 to 48 in.

For more information, *write* Velvac Inc., 3534 W. Pierce St., Milwaukee 15, Wis.

20-in. Bandsaw Cuts Stainless or Plastics

HERE is a versatile bandsaw for the foundry, toolroom, pattern shop, and production shop. It has variable speed (50 to 400 fpm) drive, will cut any of 58 different materials—from stainless steel to plas-

(*Please turn to Page* 114)

Load Handling is Easy— Safe with COFFING

Quik Lift
ELECTRIC HOISTS

It's easy for the operator to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The design of the pistol-grip control station and the combination strain and power cable makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

For Safety the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are mechanically interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety feature.

For Efficiency in load handling specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

DUFF-NORTON

- Pistol-Grip Push-Button Control
- Lightweight Aluminum Housing
- V-Type Brake for Maximum Braking Surface
- Easily Adjusted Limit Switch
- Complete Line of Accessories

RATCHET LEVER HOISTS

SAFETY HOOKS

CHAIN HOISTS

COFFING HOIST

DIVISION OF

DUFF-NORTON COMPANY

813 Walker Street • Danville, Illinois

Burroughs' Unique Tests and Johnson Wire Build Quality, Long Life in Business Machines

Detroit Plant Develops Own Devices For 100% Tests of Music Wire Springs

Burroughs Corporation demands music spring wire as thin as a spider web's strand but with a minimum tensile strength of 439,000 pounds per square inch.

Then—to make sure it gets what it orders—the Detroit business machine manufacturer does 100 percent testing of all wire coming into its plants. Burroughs goes further than standard test equipment would permit and has developed its own special testing devices.

Burroughs' insistence on enforcing specifications is the kind of quality challenge on which Johnson Steel & Wire Company thrives. A customer's emphasis on quality wire complements Johnson's own skill and care given to producing the best in specialty fine wires.

Precision springs, made from Johnson Steel & Wire Company's music spring wire, get 100 percent testing on unique testing machines like this. Designed and built by Burroughs, this machine verifies a spring's load-carrying capacity at various extensions. If any modification is needed, correction can be made while spring is still on test device.

Johnson Steel & Wire has become Burroughs' major music spring wire supplier because Johnson's wire passes 100 percent inspection with flying colors.

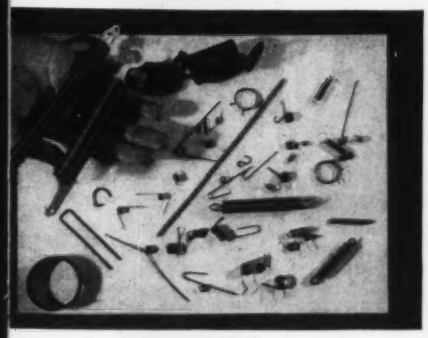
At Burroughs, where a monthly production of 3½ million precision springs of music wire is not unusual, close attention must be given to everything affecting performance of the finished spring. Failure of even the simplest spring could disable an adding machine, cash register, calculator or any of the dozens of different business machines Burroughs makes.

For its new machines, as well as service parts for older models, Burroughs makes 1,300 different kinds of springs. Music wire required for them ranges from .005-inches in diameter (with minimum tensile strength of 426,000 psi) to the largest diameter used—.106 inches in diameter, (with a minimum tensile of 268,000 psi).

Here's what Burroughs wants from music spring wire, in addition to tensile strength:

The coating, in the case of tin-coated music spring wire, must be uniform and adherent to eliminate peeling, cracking or flaking during coiling.

- **High physical qualities,** uniform cast and smooth, lustrous surfaces are another must so that uniform springs, within dimensions and capable of carrying assigned loads, can be produced.
- **Accuracy of dimensions** greatly affects spring coiling and spring performance. Burroughs' tolerance specifications are met consistently by Johnson's wire.
- **Straightness requirements** for pre-straightened wire call for a three-foot length of wire cut from a



Here's some of the approximately 1,300 different kinds of springs which Burroughs Corporation manufactures from Johnson Steel's music spring wire.

coil to be straight within 4 inches for .013-inch diameter wire and straight within 3 inches for wire .014-inch diameter and larger.

• **Coilability** is assured in the music spring wire Burroughs buys. Burroughs specifies that wire (.105 inch in diameter and smaller) must meet this test:

Wire is wound in a tightly closed spring to a coil length of 5 inches on an arbor 3 to 3½ times the diameter of the wire. When this spring is stretched so that it sets to 3 times its original length, the coils must show a uniform pitch with no splits or fractures in the wire.

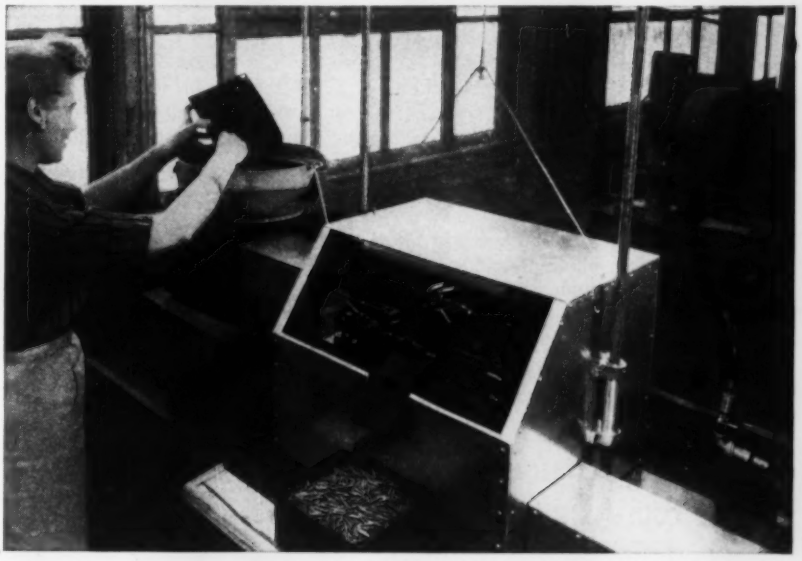
Testing completes the cycle which calls for highly skilled technicians coiling the best music spring wire available on the most modern equipment.

Testing machines, designed and built by Burroughs and used in addition to the standard machines, include the test fixture pictured here. This machine tests load-carrying capacity of springs. If any corrections are needed, they can be made while the spring is still on the test device.

Burroughs' careful attention to specs, its quality control and its testing procedure—plus its confidence in Johnson's music spring wire—are proof that Johnson can meet the toughest music wire demands.

Putting Johnson's music spring wire on your production lines starts benefiting you immediately. A corps of skilled wire engineers is as close as your telephone. Get in touch today with any of the district sales offices listed at right.

Several hundred music wire springs have been installed in this portable Burroughs adding machine. Every spring is critical, says Burroughs, because even the smallest spring failure could disable the machine.



This automatic spring eye-forming machine was designed and built by Burroughs personnel. An operator is shown filling the hopper with coiled springs which will be given an eye at each end on this device.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

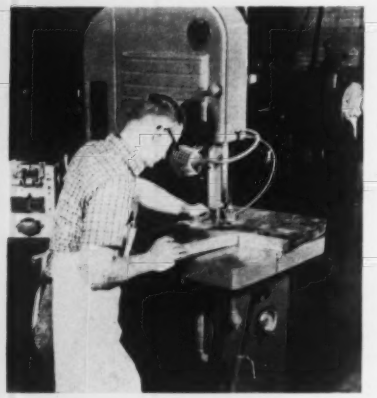
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

tics. The exact speed for any operation can be set by turning a handwheel.

Scientifically designed blade guides are featured. They provide longer blade life (up to 100 per cent more by test with older types), and more accurate, straighter cuts. The top guide supports the blade down to the top surface of the work and the lower one supports the blade to within 13/16 in. of the under surface of the workpiece.



Three-point adjustability (wheels, upper guide, and table) assures perfect alignment of key components for accurate blade tracking and alignment of guides.

For more information, *write* Delta Power Tool Div., Rockwell Mfg. Co., 455 N. Lexington Ave., Pittsburgh 8, Pa.

Numerical Control Unit Has Four-Axis Operation

MILLING machines can be numerically controlled in the horizontal, vertical, longitudinal, and tilt positions by a new Bendix unit. It permits machining of difficult part shapes such as engine mounts, bulkheads, air foil contours, or any part requiring twist type cutting operations with close tolerances.

Data are fed into the control unit by punched tape. It can be read at rates up to 300 lines per second in the forward direction and 600 lines per second in the reverse direction.

Tape rewind is automatic, making selection of rewind at the end of a part machining operation unnecessary. The operator can remove the part as the tape is being rewound.

Four decimal display position indicators with continuous readout of position location on all four axes are another feature of the control unit. The position indicator assists in setup operations and in manual operation for simple machining.

For more information, *write* Industrial Controls Section, Bendix Aviation Corp., 21820 Wyoming Ave., Detroit 37, Mich.

Spindle Finishing Unit Handles Complex Parts

PRECISION finishing of complex, high quality parts such as gears, bearing cages, splineshafts, pump rotors, and jet blades, can be done in fast, continuous production with the Almco spindle type finishing machine.

If a process time of 3 minutes is required for a part, an eight-spindle machine could do the job, turning out 160 parts an hour. The rate could be upped to 320 parts an hour by using a 16-spindle machine.

Large parts or clusters of smaller parts are chucked directly to the spindle from the operator's work station. The spindle is then automatically lowered into a high velocity stream of abrasive media consisting of oxide chips, steel balls, or other common barrel finishing media.

The abrasive is contained in a rotating tub traveling at a controlled speed of 175 to 550 sfpm. Each spindle rotates independently at 13 rpm in the abrasive stream. For more information, *write* Almco, Queen Products Div., King-Seeley Corp., Albert Lea, Minn.

NEW literature

Write directly to the company for a copy

Thermoplastic Exhaust Systems

A folder describes how the use of exhaust systems made from thermoplastics can combat corrosion, and cut maintenance and replacement costs. American Agile Corp., P. O. Box 168, Bedford, Ohio.

Automatic Assembly

Bulletin No. 601, 8 pages, discusses means of justifying automatic assembly when economic feasibility is doubtful due to low production rates or requirements. Ferguson Machine Corp., 7818 Maplewood Industrial Court, St. Louis 17, Mo.

Tracer Control

Tracer control systems for a wide variety of metalworking applications are described in Bulletin GEA-6122. General Electric Co., Schenectady 5, N. Y.

Heavy-Duty Hoists

A 12-page bulletin, No. 920, describes a line of low-headroom electric hoists. Included are construction details, mounting option information, performance data, and dimensions. Hoist & Crane Div., Robbins & Myers Inc., Springfield, Ohio.

Cold-Rolled Spring Steels

A 43-page booklet lists a wide variety of Swedish cold-rolled spring steels. Uddeholm Co. of America Inc., 155 E. 44th St., New York 17, N. Y.

Powder Metallurgy Parts

"How to Cut Precision Parts Costs with the Remet Powdered Metal Process," describes part applications and designs. Reese Metal Products Corp., Lancaster, Pa.

Tips on Care of Chain

"Vital Links to Safety," 12 pages, covers the proper use of chain, safety precautions, proper inspection, and working load limits. McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.

Nylon Core Belting

"The Story of Nylon Core Belting," 12 pages, describes how nylon core is made, its applications, and reasons for its growing popularity. L. H. Shingle Co., Camden 3, N. J.

Corrosion Resistant Coatings

Bulletin 259 charts protective coatings for steel, concrete and wood where corrosive spillage, fumes and atmospheres are involved. Wisconsin Protective Coating Corp., Green Bay, Wis.

Automatic Tracing Lathe

An 8-page brochure describes the Model 30 Auto-Tracer Lathe, its automatic tracing cycles, variable components available, with design features and specifications. Advertising Dept., Jones & Lamson Machine Co., Springfield, Vt.

Crucible stainless matches your high standards

Coil after coil of Crucible stainless gleams with unsurpassed lustre because it is precision-rolled on modern mills. Furthermore, Crucible maintains uniform qualities by methodically checking each heat — and ensures precise gauge with electronic measuring controls. For stainless in all gauges down to .010" and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE STEEL COMPANY OF AMERICA

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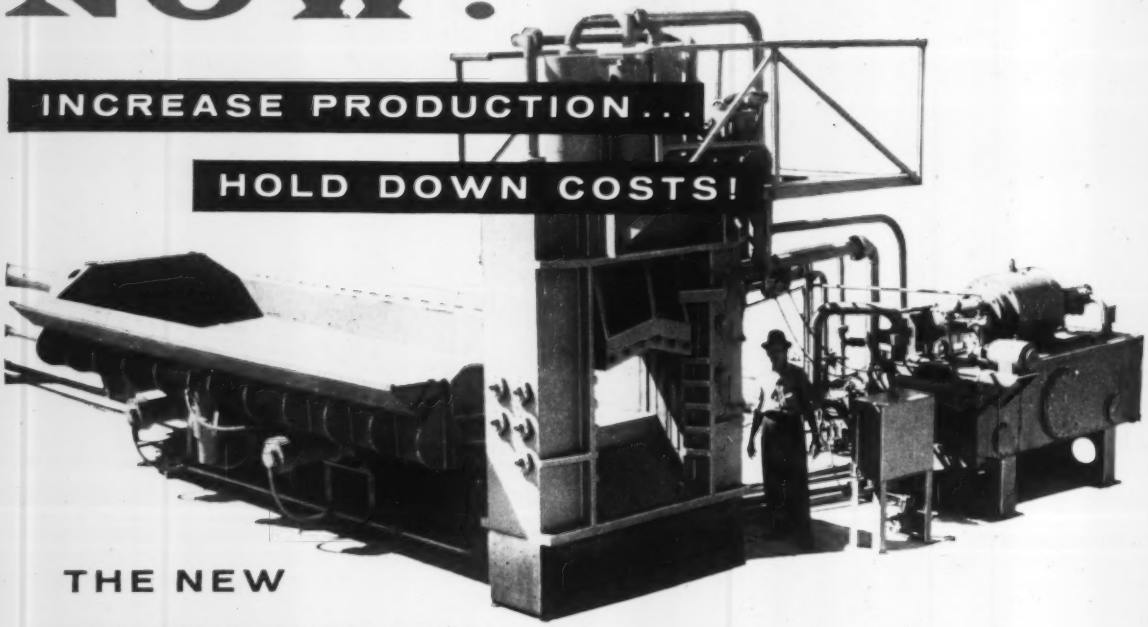
INCREASE PRODUCTION...

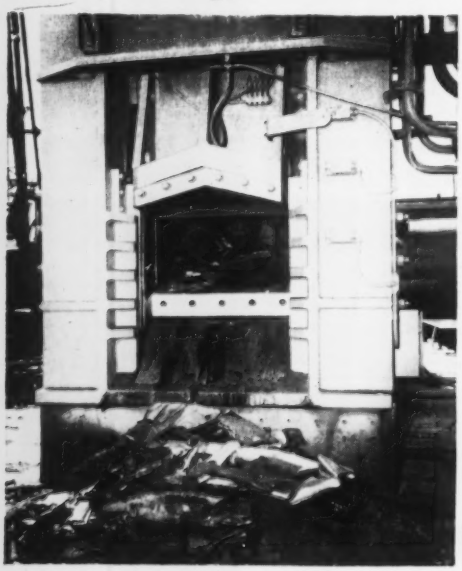
HOLD DOWN COSTS!



THE NEW

HARRIS BS-350 BALER-SHEAR

AUTO FRAMES and bulky scrap work through easily. The Harris Baler-Shear was designed to eliminate problems arising from the preparation of bulky scrap. It incorporates the principles of baling and shearing.



SPECIFICATIONS

size of charging box	264 x 83 x 41"
shear opening height	20"
shear opening width	36"
shear force	350 tons
floor space required	55' x 20'

HARRIS FOUNDRY & MACHINE CO.

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CORDELE, GEORGIA

Talk with a Man from Harris

April 20, 1959

Scrap Prices Fall Despite Steel Boom

BIGGEST SURPRISE of the current steelmaking boom is the unexpected weakness in scrap prices. Last week, STEEL's composite on the No. 1 heavy melting grade fell $1.50 to $34.67 a ton. That's the lowest it has been since May 28, 1958. No eyebrows were raised then because the industry was operating at only 58 per cent of capacity.

OUTPUT AT RECORD HIGH— Last week, by contrast, operations were at 93.5 per cent and production was the largest in history: 2,647,000 net tons of steel for ingots and castings. The last time steelmakers ran their furnaces at 93 per cent (in March, 1957) they had to pay $48 for the prime grade of scrap.

WHY SCRAP FALTERS— Scrap dealers shared the steel industry's 1957-58 recession, but they haven't participated in its recovery. Here's why: 1. Mills are showing a decided preference for pig iron. Costs can be held to $35 or $40 a ton (vs. $65 for scrap in 1956) and the use of hot metal increases open hearth efficiency. 2. Blast furnace output has been boosted by the use of oxygen, higher pressures, beneficiated ores, and self-fluxing sinters. Five furnaces will make as much pig iron today as six produced a few years ago. 3. Operating men fear contaminants in dealer scrap. Since they're pushing for all the production they can get, they don't want to risk spoiled heats. If they can't have hot metal, they want railroad or industrial scrap. 4. Big tonnages are moving to the mills under private contracts. 5. Steelmakers are generating a lot of home scrap. 6. Mill inventories are estimated at 8.2 million tons, of which 6 million were purchased at prices above today's market. Facing a possible midyear strike, steelmakers want to pull their inventories down.

BETTER DAYS AHEAD?— "I'm thoroughly convinced that the steel industry isn't being punitive in its attitude toward us," says Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel. He thinks scrap dealers should: 1. Urge mills to return to a "better balance of metallics" so that the scrap collection machinery can be maintained. 2. Co-operate in research aimed at upgrading scrap; convince operating men of its high quality. 3. "Sit down with the mills and see if we can't work out an increased flow of purchased scrap to them."

Export trade looks better, says Mr. Barringer. Reason: Japanese steelmakers have ordered 1 million tons for shipment in the second and third quarters.

ORDERS TAPER OFF— New orders for sheets have fallen off sharply but only because buyers realize that they'd have no chance of getting delivery in the first half if they ordered now. Although books are open for the third quarter, entries are few and far between. Mills don't look for much activity before mid-May.

DELIVERIES ON SCHEDULE— Despite the frenzied buying of recent weeks, mills are shipping steel in an orderly fashion. In Chicago, a steelmaker reports that it's "only one to three weeks behind" on cold-rolled and galvanized sheets. An eastern bar mill will be "current" for the next 30 days.

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*Current prices were published in the Apr. 13 issue and will appear in subsequent issues.

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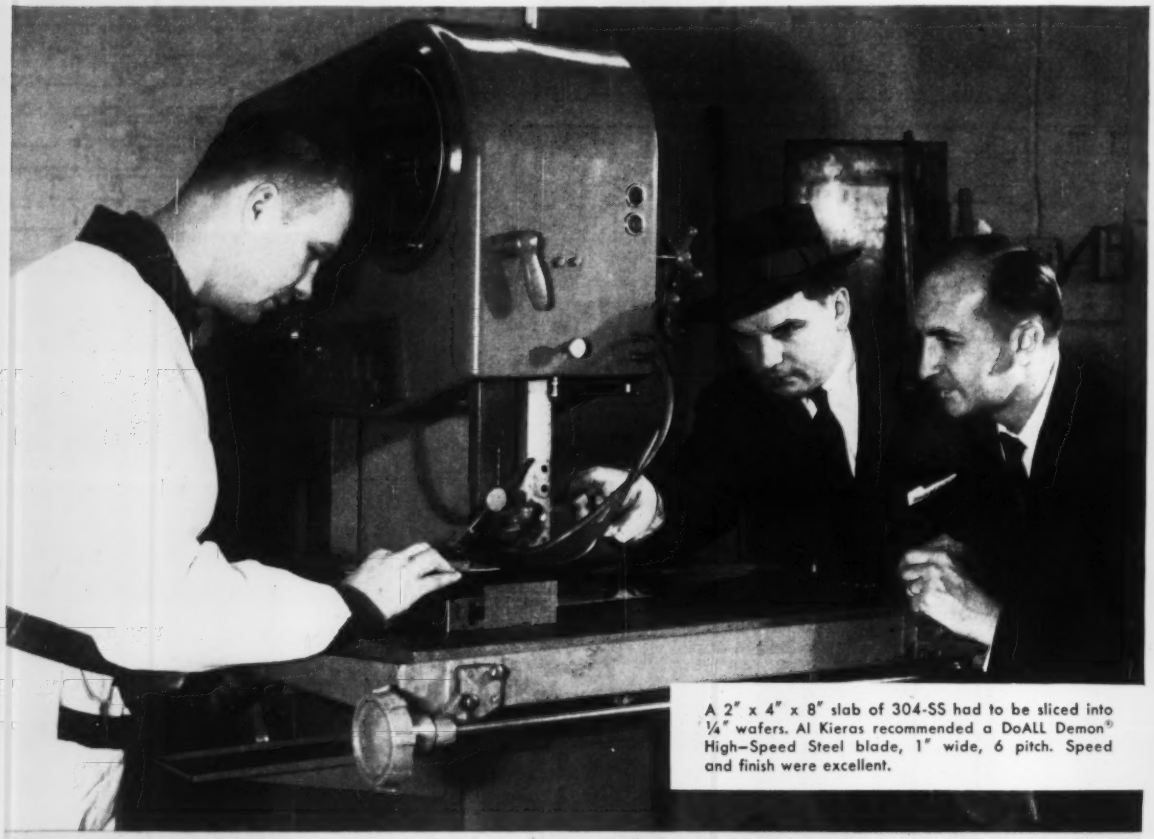


A 2" x 4" x 8" slab of 304-SS had to be sliced into ¼" wafers. Al Kieras recommended a DoALL Demon® High-Speed Steel blade, 1" wide, 6 pitch. Speed and finish were excellent.

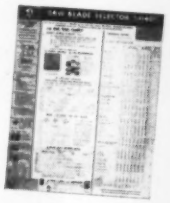
DoALL Sells Machines and Blades, but its **EXPERT HELP IS FREE!**

It takes more than a fine band machine and a perfect blade to get top efficiency in your band sawing. It also takes specialized knowledge to select the proper blade, feed, speed, coolant, etc. This is the expert help that you get FREE from your DoALL Sawing Specialist. Here's an example:

When Al Kieras, Sawing Specialist of DoALL Boston Company, was called in by Thomas J. Melsky, president of Melfore Machine Company, Inc., Boston, he was able to solve the sawing problem described above. His recommendations resulted in top production at lowest cost.

Back of Al Kieras and every one of the 200 DoALL Sawing Specialists are (1) years of special training, (2) the combined experience of all DoALL Sawing Specialists and the DoALL Sawing Research Laboratory, and (3) the largest assortment of band tools made—18 types and over 300 width-pitch-set combinations.

Yes, DoALL makes and sells the best machines and blades, but its expert help is free. Call your local DoALL Sales-Service Store today. Ask for a Sawing Specialist to call on you. He has helped others. He can help you. His expert help is free—without obligation.



FREE! "Saw Blade Selector Chart" helps operators improve their sawing techniques . . . get this wall chart from your local DoALL store.

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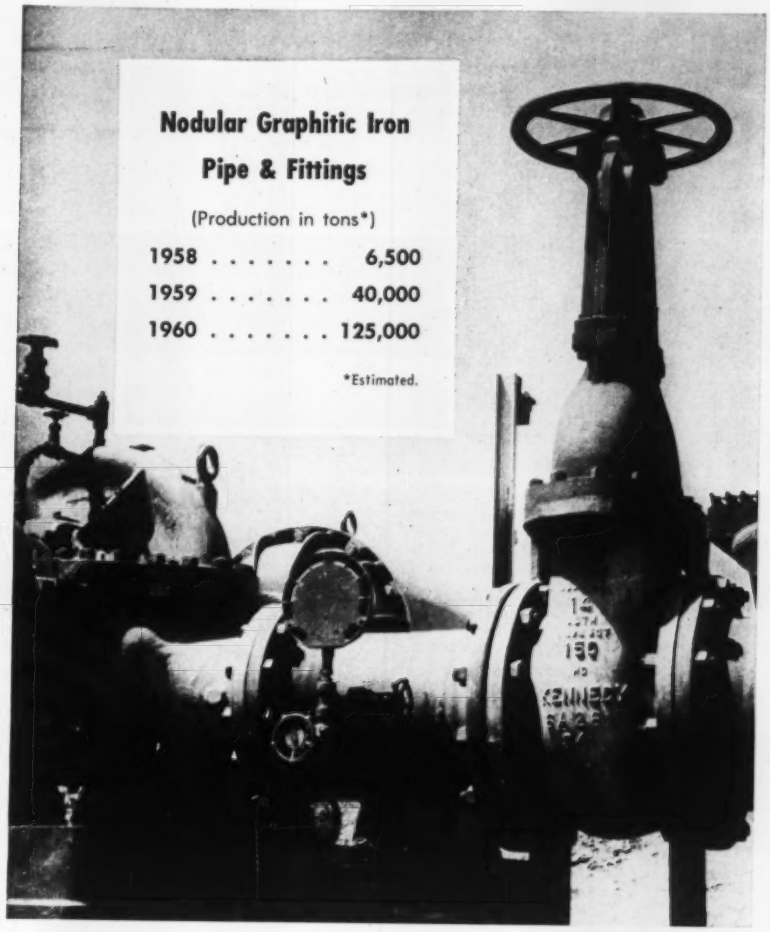
The DoALL Company, Des Plaines, Illinois



International Nickel Co.

Nodular Pipe Output To Skyrocket 500%

PRODUCTION OF nodular graphitic pipe and fittings will leap to 40,000 tons this year and reach 125,000 tons in 1960. Last year, production barely exceeded 6500 tons. One expert estimates 121,000 tons of pipe and 220,000 tons of fittings will be made in 1961.

"Such pipe is available in commercial quantities for the first time," says American Cast Iron Pipe Co., Birmingham. Companies that aren't in full production say it's only a matter of time.

Several manufacturers of pressure iron pipe plan greater use of the process. (International Nickel Co. Inc., New York, holds certain patents on it.)

• **It's Strong**—Ductile iron pipe is being used in underground gas and water mains where high pressure, crushing, extreme bend, unusual shocks and stresses, or unstable bedding and deep fills are encountered.

A midwestern cast pipe maker entered the field late in 1958 and produced 1000 tons in the last quarter. Most of the tonnage went for one municipal gas distribution system. The company says: "This user is sold on the added strength of the pipe and believes it is a superior product."

The firm adds: "We have not done much with nodular fittings. But as a matter of policy we have switched to them from regular gray iron for the bells on our river crossing pipe. Ductile iron is especially suitable for fittings in hard service. We are experimentally producing high pressure fittings with a thinner wall thickness than used for conventional castings."

• **To Help Foundries** — Some believe nodular iron will help the foundry industry penetrate the general pipe field to a greater extent.

Ductile iron can be hot worked, although not to the same extent as steel. Iron pipe is presently made in 18 to 20 ft lengths. It is claimed that a pipe of extra heavy wall thickness can be centrifugally cast and drawn out to 30 to 40 ft, the length at which steel is marketed.

• **Corrosion Resistant**—Authorities say nodular iron has corrosion resistance within the scope of ferrous materials. It resists ground and sea water corrosion and slightly alkaline solutions. Chemical process industries report good corrosion properties in certain media. So the pipe also has important applications in the chemical, petroleum, and marine industries.

• **Economical** — Economy is cited as the chief reason for its use in valves, fittings, pumps, and compressors. Valves are used in the petroleum refining industry, mainly in the 150 lb class and to API 600 dimensions. They are reported to have high yield strength and are said to be up to 25 per cent cheaper than some competitive valves.

• **Other Uses**—In addition to pipes, fittings, and affiliated uses, nodular graphitic iron is finding increasing markets in mass production items (certain automobile components, for example). It also has applications in ingot mold and car wheel production. It's estimated that 178,000 tons of nodular iron castings were produced in this country last year and 304,000 tons were manufactured in the world.

Net Pricing Being Studied By Other Fastener Makers

Industrial fastener makers are still "waiting and seeing" in appraising the effects of Pittsburgh Screw & Bolt Corp.'s switch to net delivered pricing.

So far as can be determined other makers have not followed Pittsburgh's action, though most of them contacted say they are studying the situation. They say they have had both favorable and unfavorable comment from buyers.

Pittsburgh Screw's new pricing substitutes net prices for the traditional list and discount system. Quantity differentials are such that the lowest price applies to three or four kegs; heretofore, the lowest price was possible only on 40,000 lb and up.

Freight Is Absorbed — Another change is that shipments of 20,000 lb or more are delivered with no freight charge. Long established practice is for makers to equalize freight with the nearest competitor.

Whether net pricing results in any significant revision in the over-all price setup is uncertain. Pittsburgh Screw & Bolt said the change does not involve any over-all increase or reduction. Other makers think net prices on small lots may be lower, but those on medium lots will be unchanged, while on large lots prices may be higher than if they are arrived at by the list and discount method.

Big Cost Factor — Further, it's pointed out that net pricing necessitates issuance of complete new price books every time there's a change in quotations. This is an important cost factor, and could be particularly burdensome to distributors and jobbers who handle a large share of total production. Under the list and discount system only printed slips showing the new discounts have had to be issued.

In a letter on pricing sent its distributors last week, one large manufacturer said:

"We have no intention of changing our practice of selling on a list and discount basis, nor of changing our practice of protecting our distributors who are good enough to place attractive stock orders with us.

"However, for several months now, our company has been analyzing our up-to-date costs and our customers' problems with a view toward simplifying our marketing pattern through the adoption of new basic list prices. These will be easy to understand and practical to use. Obviously, they can readily be converted into net price schedules for those who wish to purchase on such a basis.

"Because of the wide scope and size range of our product, and the great variety of conditions which we need to meet, this is no simple task, and we ask your indulgence while we complete our studies. By early summer, however, we should be able to put it into effect."

Sheets, Strip . . .

Sheet & Strip Prices, Pages 130 & 131

Something of a mixed situation has developed in sheet steel demand. Some makers note an increase in orders since the beginning of this month, canceling out the leveling off in buying that had been underway for two or three weeks. Other makers report continued sharp decline in new orders, due largely to the fact buyers realize they can't get additional tonnage on mill order books for delivery before June 30.

Those makers reporting improvement in buying attribute the increase to the approach of the Apr. 15 leadtime for June, when set-asides for that month must be converted into actual specifications. Some of the increase involves third quarter tonnage, which is reported developing in surprising volume.

Orders Extend Through Summer —Such future buying is not only for July, with a view to getting favorable position in mill books in event of a steel strike, but some of it is for August, and even later positions. Certain large consumers are buying on as heavy a scale as they did for second quarter, and it appears confidence in the outlook is stronger than it was only a few weeks back. That's because: Consumption is beyond earlier expectations; also it's difficult to place much additional tonnage for shipment this quarter. Indications are third quarter ordering will pick up sharply about mid-May.

Broadly, all tonnage items are sold out for the remainder of this quarter. Some hot-rolled sheet specifications have not yet reached the mills against June set-asides, but the next few days should see schedules for that month completely filled. While there may be some duplicate orders on mill books, so far there have been few tonnage cancellations. Ford Motor Co. is reported trying to line up additional tonnage for June delivery because its sales have surpassed its expectations.

Specialties Sold Out—Except for electrical sheets, specialties are sold out for this quarter. The movement of electrical sheets has been retarded by the substitution of cold-rolled sheets in certain applications, especially small motors.

The movement of steel by lake freighter from Buffalo to Detroit is getting underway.

Steel Bars . . .

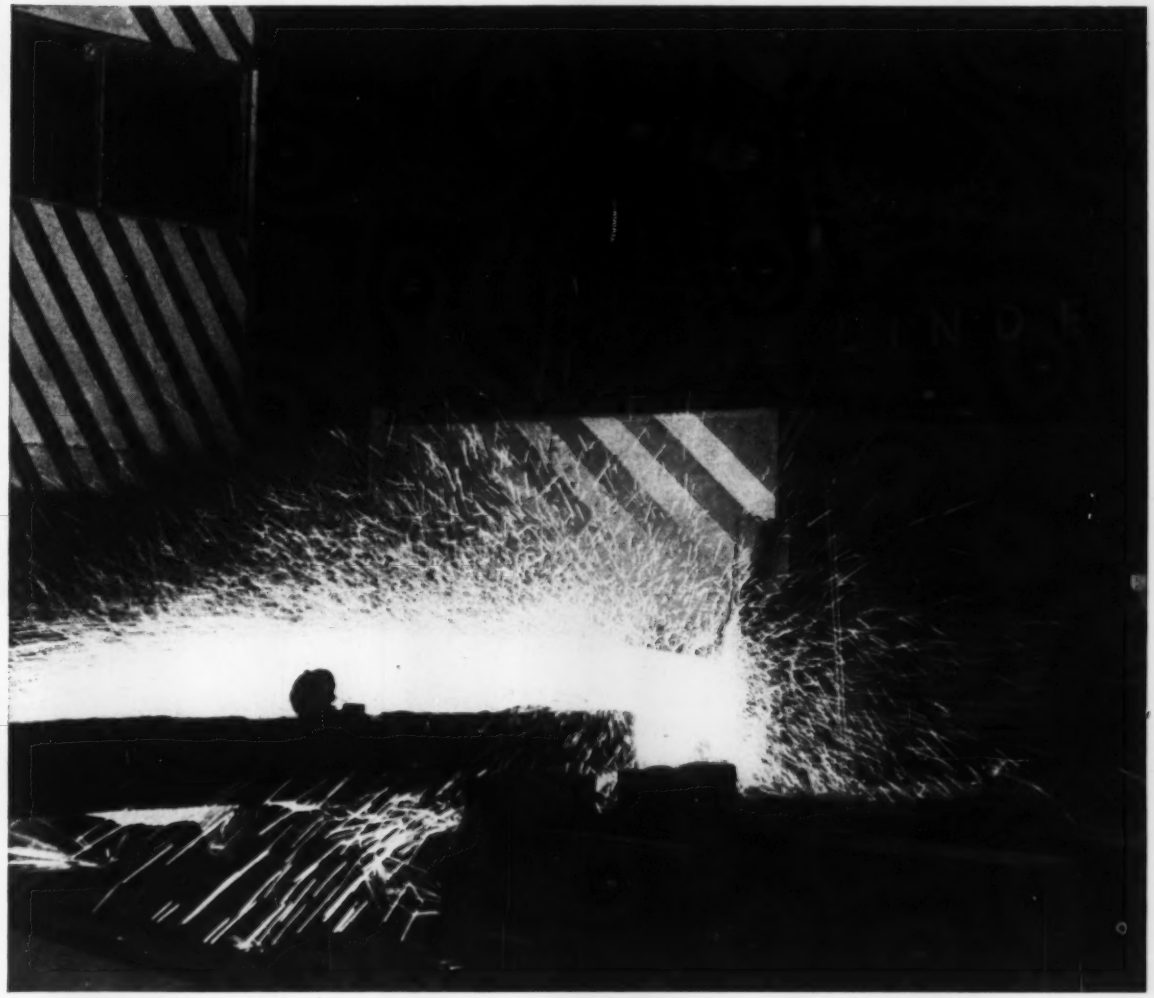
Bar Prices, Page 129

Although tonnage is available for second quarter delivery, hot-rolled carbon bar inquiry continues brisk.

Fastener manufacturers and cold drawers are ordering actively, and over-all demand is well diversified. Steel service centers are buying more freely than they were. They're running into increasing demand for a wide range of sizes from small consumers. In New England, forge shops are pressing for deliveries.

While consumption has been stepped up, it's estimated that as much as 40 per cent of current and recent buying has been for inventory. Midwest mills say instances where users are not able to build inventories are rare. Over-all steel inventories, they say, are about twice what they were a year ago.

Steelmakers point out that if any number of users were running short of steel or not building inventory at a rate considered adequate, they would be seeking arrearages from other than mill sources, and while



LIN-DE-SURFACER MACHINE HOT-SCARFS 4.27 MILLION TONS IN 27 MONTHS

Weirton Steel Company, Division of National Steel Corporation, set the record. Of the 65 *Lin-de-Surfacer* machines serving steel plants throughout the world today, this is the champ—4.27 million tons in just 27 months.

Mechanized scarfing is the fastest, most economical way to upgrade surface quality. Your costs depend on your production because you lease the *Lin-de-Surfacer* machine on the basis of the tonnage it processes. It can be rolled on or off the production line in seconds. Scarfing speeds can reach 195 ft./min.

And—most important—savings over hand-conditioning methods are estimated conservatively at $1.50 per ton—are often much higher.

Linde Company—a leader in the production and distribution of oxygen and acetylene—pioneered the development of mechanized scarfing. To find out how hot-scarfing can help your operations, call the nearest Linde office. Or write Linde Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. In Canada: Linde Company, Division of Union Carbide Canada Limited.

"Linde," "Lin-de-Surfacer," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Linde TRADE-MARK

UNION CARBIDE

warehouse business is improved, it has not expanded at a rate that suggests large consumers are buying for inventory.

Some bar mills have been forced to restrict June bookings of carbon bars. Only spot openings are available for that delivery position, some makers report.

While small size alloy bars have been booked through June in many cases, demand for hot alloy bars is generally light. But consumers are finding deliveries more extended than they were. On an as-rolled basis, tonnage is available for June, but bars requiring special treatment are harder to get, deliveries running into the third quarter.

Wire . . .

Wire Prices, Pages 131 & 132

Forward buying of wire products has slackened at some points. In New England, mills have openings in June schedules for low and high carbon grades of wire.

Except for automotive requirements, strike hedge buying of wire is relatively behind that of flat-rolled items. In some cases, specifications are being revised to meet new sizes and grades required for increased current consumption.

Most wire rod schedules are filled through June. Covering of semi-finished steel needs has been heavier than on finished wire.

The Quartermaster, Columbus, Ohio, closes Apr. 27 on a requirement contract, including 3 million steel helical extension springs.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 130

Sales of reinforcing steel bars are picking up as construction gains momentum. Until recently, some producers were absorbing freight to meet the competition from German and Belgian mills which were underselling domestic mills by $10 to $25 a ton on the East Coast. Now that demand has improved seasonally, sellers are less willing to absorb freight and are not pushing for sales in areas where foreign competition is too severe.

Barmakers are expediting orders to get out tonnage before a possible midyear suspension of operations. While order books are filling up, makers still can give relatively prompt shipments.

One of the largest shipments of steel reinforcing bars ever imported on the Pacific Coast has been unloaded at Encinal Terminals, Alameda, Calif. The 4500 tons of bars were produced in West Germany.

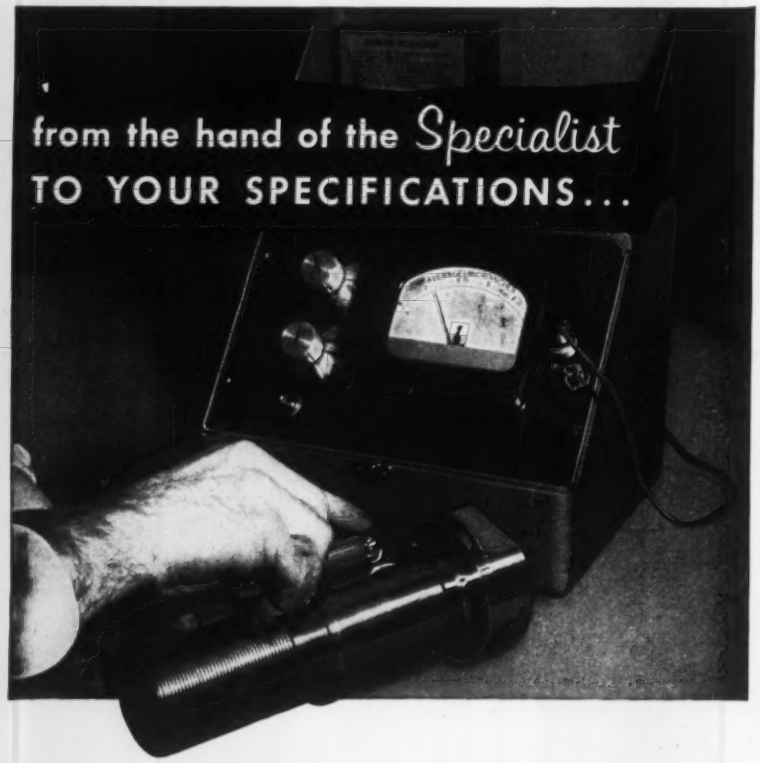
Tubular Goods . . .

Tubular Goods Prices, Page 135

Demand for tubular goods is less pressing, but the mills are heavily booked in most categories through the rest of this quarter.

At Pittsburgh, orders for oil country goods are tapering noticeably. The mills, though, are loaded with tonnage for delivery before June 30. Consumers aren't showing much interest in third quarter shipments. Reason: The major oil companies had jumped into the market early in the year, and now they seem to be fairly well protected against any possible strike-induced shortages this summer.

• **Drill Pipe Slow**—Tubing and casing are still moving well. But drill



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Here is accurate measurement of precision craftsmanship in meeting Government and National Standards on Standard and Special fasteners . . . Producing to your specifications a wide diversity of special and standard bolting to resist corrosion, extreme temperatures, tensile, fatigue, impact and shear stresses is our exclusive job . . . this experience has been growing steadily since 1913. It is yours when you send your specifications to us.

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pipe is sluggish; one maker has been booking at only about half of capacity. Line pipe is active, however, but some mills have been sold out for first half on this category since the start of the year. Producers of pipe for the big trunk lines are taking orders for third and fourth quarter at a brisk rate.

Standard pipe is moving at a faster pace. This reflects the seasonal pickup in building, which has been delayed in many parts of the country by unusually bad weather. Buttweld pipe still shows relatively little improvement. One Pittsburgh mill had open space in its April schedule last week.

Japanese Plate Tonnage Seen Headed for Detroit

Another 10,000 tons of Japanese plates are reported held in San Francisco for shipment to construction interests in Michigan. One is a big bridge builder.

Even allowing for duty and transportation costs, it's said that the Japanese plates can be delivered in the Detroit area below domestic prices.

The situation is raising a question in the trade: If there's a steel strike this summer and some consumers find themselves short of steel, will they import? It's felt that sheets and strip would be imported under such circumstances. So a second question is posed: What will this do to the effectiveness of a strike?

Imports through Texas ports hit 48,760 tons during December, 1958; 52,012 in January; and 60,469 in February. Reinforcing bars accounted for 22,782 tons of the February total, but shipments included a full range of steel products.

Foreign steel prices have been rising. They average about 5.00 cents a pound in the Houston area, compared with the domestic average of 5.50 cents.

Plates . . .

Plate Prices, Page 129

Sheared plate demand is heavy—but so is production. As a result, there are still openings in some schedules for June shipment tonnage. These should fill up quickly, and expectations are the mills will have all the tonnage they can handle this quarter.

Some pickup in third quarter demand is likely. Most sellers anticipate a more active summer than they had expected only a short time ago. Everything depends on the outcome of labor negotiations in May, and, in event of a strike, upon the length of the suspension.

Freight carbuilders are pressing platemakers for second quarter shipment tonnage. However, they're not showing much interest in later delivery. This may be due in part to the recent flurry of car buying and the subsequent lag, which raises some question with respect to future commitments. The railroads need more cars than they've ordered, but financing presents a problem.

Fabricated pipelinework, shipbuilding, and repair requirements are being sustained in substantial volume. Heavy building construction and tankwork needs are seasonally more active. A slight pickup in paper mill needs is noted.

New King-Sized DUMPMASTER Automatically Collects and Hauls Up To 120 cu. yds. of Refuse per Trip

DEMPSTER BROTHERS' Newest Addition Cuts Waste Disposal Costs

The famous DEMPSTER-DUMPMASTER 24DB now has a big brother in the CA60-30DB model. Like the original Dumpmaster, it automatically handles detachable containers in one through six cubic yard sizes. However, it can pick up a gross load of 6000 pounds as compared to the 24DB's 3000 pound capacity.

Another important difference in capacity—the new model can compact up to 120 cubic yards of loose refuse while the 24DB gets up to 100 cubic yards per trip. Like all Dumpmasters, the new 30DB has clearance arms for safety . . . they never pass the cab windows . . . can't injure the operator.

Write For FREE BROCHURE

Shown above is the Dempster-Dumpmaster CA30-24DB model which has a capacity of 100 cubic yards of loose refuse material

Shown above is the CA15-18DB which has a capacity of 72 cubic yards of loose refuse material

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STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

The steel service centers are ordering more tonnage for May-June shipment.

Distributors . . .

Prices, Page 136

Steel service centers report a steady increase in volume of new business. The larger turnover is attributed to improved economic conditions, stepped up activity in the construction industry, and some strike hedge buying. Bookings by distributors have not increased at a rate that suggests large consumers are buying for inventory.

The pickup in buying is expected to gain momentum during the next two months, indicating that May and June will be banner months. All products are in strong demand. With mills lagging slightly on some deliveries, many consumers are likely to turn to distributors for supplemental tonnages.

Suppliers of imported steel continue to grab a significant slice of business, particularly in the South and Southwest, by undercutting the domestic market.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1200 tons, seven state bridges, Chelmsford-Westford-Tynesboro, Mass., to City Iron Works, Wethersfield, Conn.; Halloran Construction Co., subcontractor under M. A. Gammino Construction Co., Providence, R. I.; also, 115 tons of steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

4000 tons, state viaduct, Erie County, New York, through A. E. Ottaviano Inc., Croton-on-Hudson, N. Y., general contractor, to Ernst Construction Corp., Buffalo.

1320 tons, state highway project, Windsor Locks, Conn., through White Oak Excavators Inc., general contractor, to City Iron Works, Wethersfield, Conn.

450 tons, Daughters of Israel Home, West Orange, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

445 tons, two, 9 span composite, wide flange beam bridges, Middlesex, Vt., to Vermont Structural Steel Corp., Burlington, Vt.; Ralph B. Goodrich Inc., Burlington, is general contractor.

325 tons, School of Nursing, Ohio Valley General Hospital, Wheeling, W. Va., to Vulcan Rail & Construction Co., Wheeling; Engstrom & Wynn, Wheeling, general contractor; 75 tons, concrete reinforcing bars to Truscon Steel Div., Republic Steel Corp., Cleveland.

315 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Knoxville Iron Co., Knoxville, Tenn.

300 tons, nonferrous foundry, Neptune Meter Co., Queens, N. Y., to Harris Structural Steel Co., New York.

255 tons, high school, Pompano Beach, Fla., to Coastal Steel Construction Co., St. Petersburg, Fla.; Kenneth Smith Construction Co., Daytona Beach, Fla.

265 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Weldon Steel Co. Inc., Westbury, Long Island, N. Y.

200 tons, structurals and bars, Pulaski Junior High School, New Britain, Conn., to National Steel Fabricators, Newington, Conn. (structurals), and Scherer Steel Co., East Hartford, Conn. (reinforcing); Ames Construction Co., Hartford, general contractor.

200 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Oregon Steel Mills Div., Gilmore Steel Corp., Portland, Oreg.

157 tons, state bridgework, Chenango County, New York, through County Asphalt Co., general contractor, to Schenectady Iron & Steel Co., Schenectady, N. Y.

115 tons, three-span stringer bridge, Falmouth, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Theodore Loranger Construction Co., New Bedford, Mass., contractor; 75 tons, concrete reinforcing bars, to Plantations Steel Co., Providence, R. I.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3500 tons, foundation, 52-story Prudential Center Tower, Boston, to U. S. Steel Supply Div., U. S. Steel Corp., Boston; George A. Fuller Construction Co., Boston, is general contractor.

600 tons, ten highway structures, Chelmsford-Westford-Tynesboro, Mass.; also 115 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.; Halloran Construction Co., Providence, R. I., subcontractor, bridges.

535 tons, 1025 ft, 11 span combination stringer and girder bridge, Messalonskee Stream, Waterville, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Cianchette Bros. Inc., Pittsfield, Maine, general contractors; also, 1495 tons, steel H piles, to Bancroft & Martin.

240 tons, high school, Pompano Beach, Fla., to Bushnell Steel Co., Miami, Fla.; Kenneth Smith Construction Co., Daytona Beach, Fla., general contractor.

150 tons, two, 9 span composite wide flange beam bridges, Middlesex, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Ralph B. Goodrich Inc., Burlington, Vt., general contractor; also, 135 tons of steel piles to Vermont Structural Steel Corp., Burlington.

100 tons or more, sports coliseum, Jacksonville, Fla., to Florida Steel Products Co., Jacksonville; Daniel Construction Co., Jacksonville, general contractor.

PLATES . . .

PLATES PLACED

520 tons, hull, General Stores Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

500 tons, 5 million gallon watertank for Spokane, Wash., to Chicago Bridge & Iron Co., Seattle.

465 tons, hull, General Stores Supply Office, Navy, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, storage tank, Glasgow (Mont.) Air Base, to Pittsburgh-Des Moines Steel Co., Seattle, by U. S. Engineer.

145 tons, hull, General Stores Supply Office, Navy, Philadelphia, to Southern Galvanizing Co., Baltimore.

105 tons, stainless, General Stores Supply Office, Navy, Philadelphia, to Eastern Stainless Steel Corp., Baltimore.

PLATES PENDING

6000 tons, 50 vertical, bolted steel tanks, 10,000 barrel capacity each; bids Apr. 21, Yards & Docks Supply Office, Port Hueneme, Calif.; additional 58 tanks being reserved for small business under partial set-aside.

1000 tons or more, penstocks and appurtenances, Cooper Lake hydroelectric project, Alaska; Beall Tank & Pipe Co., Portland, Oreg., low at $549,586, to Chugach Electric Association, Anchorage, Alaska.

775 tons, liner plate, Cougar Dam, Lane County, Oregon; bids to U. S. Engineer, Portland, Oreg., June 2.

500 tons, 5 million gallon watertank; Hammond Iron Works, Provo, Utah, apparently low at $92,744 to Spokane, Wash.

500 tons or more, fuel tanks, Fairchild Air Field, Spokane, Wash.; bids to U. S. Engineer, Walla Walla, Wash., Apr. 21. (Similar installation is also planned for Cheyenne and Denver bases.)

400 tons, high tensile, grade Hy-80, Navy Purchasing Office, Washington, D. C.; bids Apr. 21.

Steel Product Shipments—February, 1959

Steel Products Shipments—February, 1959
(Net tons; all grades)

Products	Carbon	Alloy	Stainless	Total First Two Months 1959	1958
Ingots, etc.	11,477	10,021	1,400	42,556	46,437
Blooms, slabs, etc.	90,235	42,477	1,228	259,809	207,540
Tube rounds	1,094	226	.....	3,398	1,303
Skelp	749	.....	.....	11,031	11,512
Wire rods	108,273	2,365	841	201,223	123,417
Structurals	382,284	3,765	4	716,386	719,785
Steel piling	24,271	.....	.....	54,410	59,855
Plates	525,533	29,707	2,839	1,066,975	958,388
Rails—standard	73,082	.....	.....	125,927	95,786
Rails—all other	3,354	.....	.....	6,652	6,404
Joint bars	3,158	.....	.....	5,304	6,314
Tie plates	16,763	.....	.....	23,424	20,459
Track spikes	4,313	.....	.....	7,719	6,445
Wheels	15,559	106	.....	30,054	40,625
Axles	6,474	19	.....	11,610	24,425
Bars—hot rolled	505,304	147,587	3,424	1,279,540	853,796
Bars—reinforcing	141,219	.....	.....	275,550	224,803
Bars—cold drawn	107,826	20,431	4,487	255,527	163,795
Tool steel	787	6,859	.....	15,191	12,178
Standard pipe	193,067	37	.....	372,615	305,296
Oil country goods	159,687	32,232	.....	375,635	248,700
Line pipe	227,011	5	.....	448,925	431,574
Mechanical tubing	47,375	23,619	348	138,581	92,520
Pressure tubing	17,302	4,131	1,141	49,059	45,392
Drawn wire	217,445	3,932	2,378	439,204	334,935
Nails & staples	30,941	.....	1	61,202	60,328
Barbed wire	4,734	.....	.....	8,694	9,200
Woven wire fence	13,692	.....	.....	25,007	29,041
Bale ties, etc.	5,987	.....	.....	13,324	4,498
Black plate	58,536	.....	.....	109,219	101,214
Tin & terne plate—hot dipped	24,602	.....	.....	54,906	60,906
Tin plate—electro	442,625	.....	.....	859,835	872,220
Sheets—hot rolled	756,447	23,284	3,958	1,514,706	945,044
Sheets—cold rolled	1,312,819	5,133	11,628	2,668,486	1,575,411
Sheets—galvanized	281,637	.....	.....	560,881	354,276
Sheets—other coated	26,349	.....	.....	52,452	28,504
Electrical Sheets & Strip	3,538	53,892	.....	107,632	74,059
Strip—hot rolled	118,800	1,872	1,610	233,406	149,038
Strip—cold rolled	92,620	1,600	18,818	224,438	173,331
Total shipments (1959)	6,056,969	413,300	54,105	12,710,493	.....
Total shipments (1958)	3,967,842	259,924	35,169	.....	9,478,754

Data from American Iron & Steel Institute.

225 tons, aluminum alloy, ¾ in. thick, U. S. Naval Ordnance plant, Louisville; bids April 7.

165 tons, including sheets, General Supply Depot, Navy, Oakland, Calif.

150 tons, 420,000 gallon tank; bids Apr. 17, Yards & Docks Supply Office, Navy, Ft. Hueneme, Calif.

110 tons, Brookley AFB Alabama, bids May 5; also, 155 tons of steel sheets, same date.

100 tons, high tensile, type I, naval shipyard, Portsmouth, N. H.; bids Apr. 29.

PIPE . . .

CAST IRON PIPE PLACED

137 tons, 18 in. for Alderwood Manor, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

95 tons, 4 to 12 in., Pacific highway freeway project, Tacoma, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

Unstated, 30,045 ft of insulated pipe, 4 to 14 in. in diameter, for South Fairbanks, Alaska; Morrison-Knudsen Co. Inc., Seattle, low at $480,657 to Alaska Public Works, Juneau.

240 tons, 14 to 6 in.; bids in at Port Angeles, Wash.

STEEL PIPE PLACED

1736 tons, 24 and 42 in. pipe, Anchorage, Alaska, to Kaiser Steel Corp., Fontana, Calif.

110 tons, electric fusion welded pipe, Consolidated Edison Co., Buchanan, N. Y., to an unnamed fabricator.

100 tons or more, 482,600 ft, low carbon, welded, General Stores Supply Office, Navy, Philadelphia, to Neill Supply Co., Lyndhurst, N. J.; 146,950 ft to Standard Pipe & Supply Co. Inc., Philadelphia.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chesapeake & Ohio, 250 boxcars, to American Car & Foundry Div., ACF Industries, New York.

RAILROAD CARS PENDING

Seaboard Airline, 300 to 700 boxcars, pending.

Steel Production Record Established in March

A monthly steel production record was set in March, reports American Iron & Steel Institute. Furnaces poured 11,567,000 net tons, more than 5.3 million tons above output in March, 1958, and more than 1.9 million tons above production in February, 1959.

In only two previous months has output exceeded 11 million tons. They were: October, 1956 (11,048,513), and January, 1957 (11,008,762).

The institute's index of steelmaking for March was 162.6 in terms of the basic index of average production 1947-49. It compares with 149.5 in February and 87.9 in March a year ago.

First quarter production was 30,487,323 net tons, largest since the first quarter of 1957 when the furnaces poured 31,585,042 tons. In the first quarter last year, output was only 18,790,857 tons.

The steelmaking index for the first quarter was 147.6, compared with 91.0 during the like 1958 period.

Based on Jan. 1, 1959, capacity (147,633,670 net tons), operations averaged 92.3 per cent of capacity during March vs. 84.8 in February. The first quarter average was 83.7 per cent.

Steel Ingot Production—March, 1959

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Per cent of capacity
1959						
January ...	8,280,985	120,005	186,820	729,575	9,317,385	74.3
*February .	8,541,031	128,515	176,970	756 422	9,602,938	84.8
†March ...	10,213,000	185,000	237,000	932,000	11,567,000	92.3
†1st Qtr. ..	27,035,016	433,520	600,790	2,417,997	30,487,323	83.7

	—OPEN HEARTH—		—BESSEMER—		—ELECTRIC—		—TOTAL—	
Period	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity
1958								
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,912	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
May	5,602,123	53.9	110,366	32.3	588,670	48.2	6,301,159	52.7
June	6,378,942	63.4	88,125	26.6	660,413	55.8	7,127,480	61.6
2nd Qtr. ..	16,856,684	55.3	307,924	30.7	1,797,022	50.1	18,961,630	54.0
1st 6 Mo..	33,792,864	55.7	633,176	31.7	3,326,447	46.6	37,752,487	54.1
July	5,712,587	55.0	114,218	33.4	615,600	50.4	6,442,405	53.9
August ...	6,481,185	62.4	134,435	39.3	692,383	56.6	7,308,003	61.1
September..	6,769,660	67.3	103,194	31.2	759,518	64.2	7,632,372	66.0
3rd Qtr. ..	18,963,432	61.5	351,847	34.7	2,067,501	57.0	21,382,780	60.3
9 Mo.	52,756,296	57.7	985,023	32.7	5,393,948	50.1	59,135,267	56.2
October ...	7,795,541	75.0	148,458	43.4	895,779	73.3	8,839,778	74.0
November..	7,572,555	75.3	145,867	44.1	850,896	71.9	8,569,318	74.1
December .	7,755,002	74.6	116,637	34.1	838,883	68.6	8,710,522	72.9
4th Qtr. ..	23,123,098	75.0	410,962	40.5	2,585,558	71.3	26,119,618	73.6
2nd 6 Mo..	42,086,530	68.3	762,809	37.6	4,653,059	64.1	47,502,398	67.0
Total	75,879,394	62.0	1,395,985	34.7	7,979,506	55.4	85,254,885	60.6

Note—The percentages are based on annual capacities as of Jan. 1, 1959: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,083,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons. In 1958, the capacity tonnages were: Open hearth, 122,321,830 net tons; bessemer, 4,027,000 net tons; oxygen process, electric and crucible, 14,393,740 net tons. Total: 140,742,570 net tons.

*Revised. †Preliminary.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

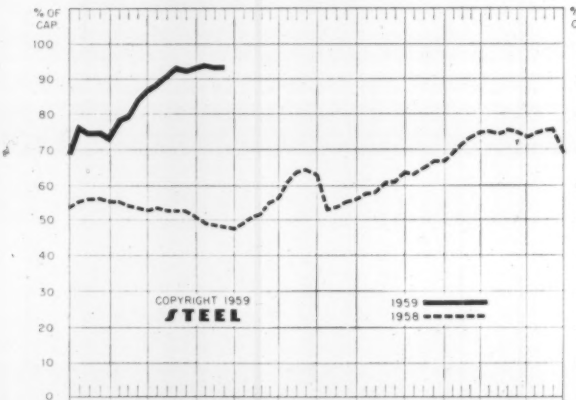
	Week Ended Apr. 19	Change	Same Week 1958	Same Week 1957
Pittsburgh	95	+ 1*	49	94
Chicago	95	— 1*	52.5	90
Eastern	92	0	49	95
Youngstown	94	+ 1	41	90
Wheeling	94	0	62	85
Cleveland	97	— 0.5*	25.5	90.5
Buffalo 104		— 1	39	92.5
Birmingham	94.5	+ 3	54.5	95.5
Cincinnati	97	+ 8*	48	62.5
St. Louis	95	+ 3*	50.5	99.5
Detroit	97.5	+ 0.5*	12	98.5
Western	93	0	65	101
National Rate ..	93.5	0	47.5	90

INGOT PRODUCTION‡

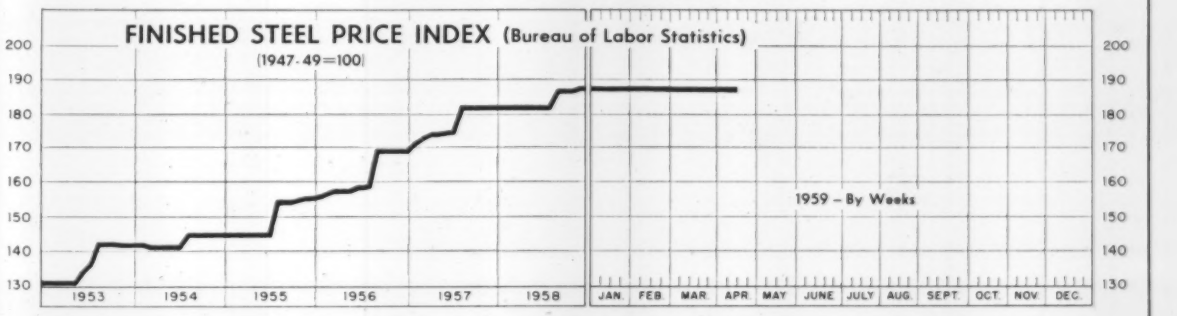
	Week Ended Apr. 19	Week Ago	Month Ago	Year Ago
INDEX ..... (1947-49=100)	164.8†	164.4	163.8	80.0
NET TONS .... (In thousands)	2,648†	2,641	2,631	1,285

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Apr. 14, 1959	Week Ago	Month Ago	March Avg	Year Ago
186.7	186.7	186.7	186.7	181.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 14

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.615
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.673
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.253
		Pipe, Line (100 ft)	199.53
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	207.515
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	April 15 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.70
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	34.67	36.17	41.67	33.50	25.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	April 15 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.725	4.405
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.10
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.10
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.65
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods 7/32-5/8" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton

	April 15 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	60.16
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$36.50	$36.50	$44.50	$33.50	$26.50
No. 1 Heavy Melt, E. Pa.	33.50	34.50	38.00	37.00	22.00
No. 1 Heavy Melt, Chicago	34.00	37.50	42.50	30.00	27.50
No. 1 Heavy Melt, Valley	39.50	40.50	45.50	32.50	25.50
No. 1 Heavy Melt, Cleve.	36.00	36.50	41.50	29.50	22.50
No. 1 Heavy Melt, Buffalo	34.50	34.50	39.50	28.50	23.50
Rails, Rerolling, Chicago	57.50	59.50	62.50	53.50	34.50
No. 1 Cast, Chicago	46.50	46.50	48.50	38.50	38.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

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Steel Prices

Mill prices as reported to STEEL, April 15, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 130; footnotes, page 132.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Ecomony,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ...140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
N.Tonawanda,N.Y. B11..6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 .....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1 7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 .....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ..5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ..6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 .....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra)

Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
Beaverfalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 .9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ...9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.425
S.Chicago,Ill. R2, W14 .5.675
S.Duquesne,Pa. U5 ...5.675
S.SanFrancisco B3 .....6.425
SparrowsPoint,Md. B2 ..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated; To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle B3, N14 .....7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt) L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ...5.575
Franklin,Pa. (4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Lackawanna,N.Y. B2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.15
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ...6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 .6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ....6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) B2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke. Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel Div. U. S. Steel Corp.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H K Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 .5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. F4 ..7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5..7.425
NewHaven,Conn. D2...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Wallingford,Conn. W2..7.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ..7.975
Youngstown S41, Y1 ..7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7.....15.85
Youngstown S41, Y1 ..7.425

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ..10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ..7.975
Youngstown S41 ....7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 ....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75
ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 ....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1.8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$10.05
Irvin,Pa. U5 .....10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70 15.70
Warren,O. R2	....	....	....	....	....	.... 15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ..8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngles B3 .....8.95
Minequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
N.Tonowanda,N.Y. B11..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Minequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W2 .....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 .....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg)
To Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler
(14½ Ga.)per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill. (37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	.198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill. (7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70§§
Struthers,O. Y1	9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras. §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread)& Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts
(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:
(Full container)

All sizes	56.0

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1⅛ in., incl.	56.0
1⅛ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1⅛ in. incl.	56.0
1⅛ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1⅛ in., incl.	57.0
1⅛ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1⅛ in., incl.	57.0
1⅛ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:
6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0

Longer than 6 in.:

⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:
¾ in. and smaller, 6 in. and shorter +85.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam:
6 in. and shorter + 5.0
Longer than 6 in. +29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15.0%.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	....	5.75	5.65	....	6.725
Minnequa,Colo. C10	....	5.75	5.65	....	7.225
Steelton,Pa. B2	....	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Labanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

Designed and built by . . .

UNITED®

4-HIGH 4-STAND TANDEM BRASS MILL

UNITED

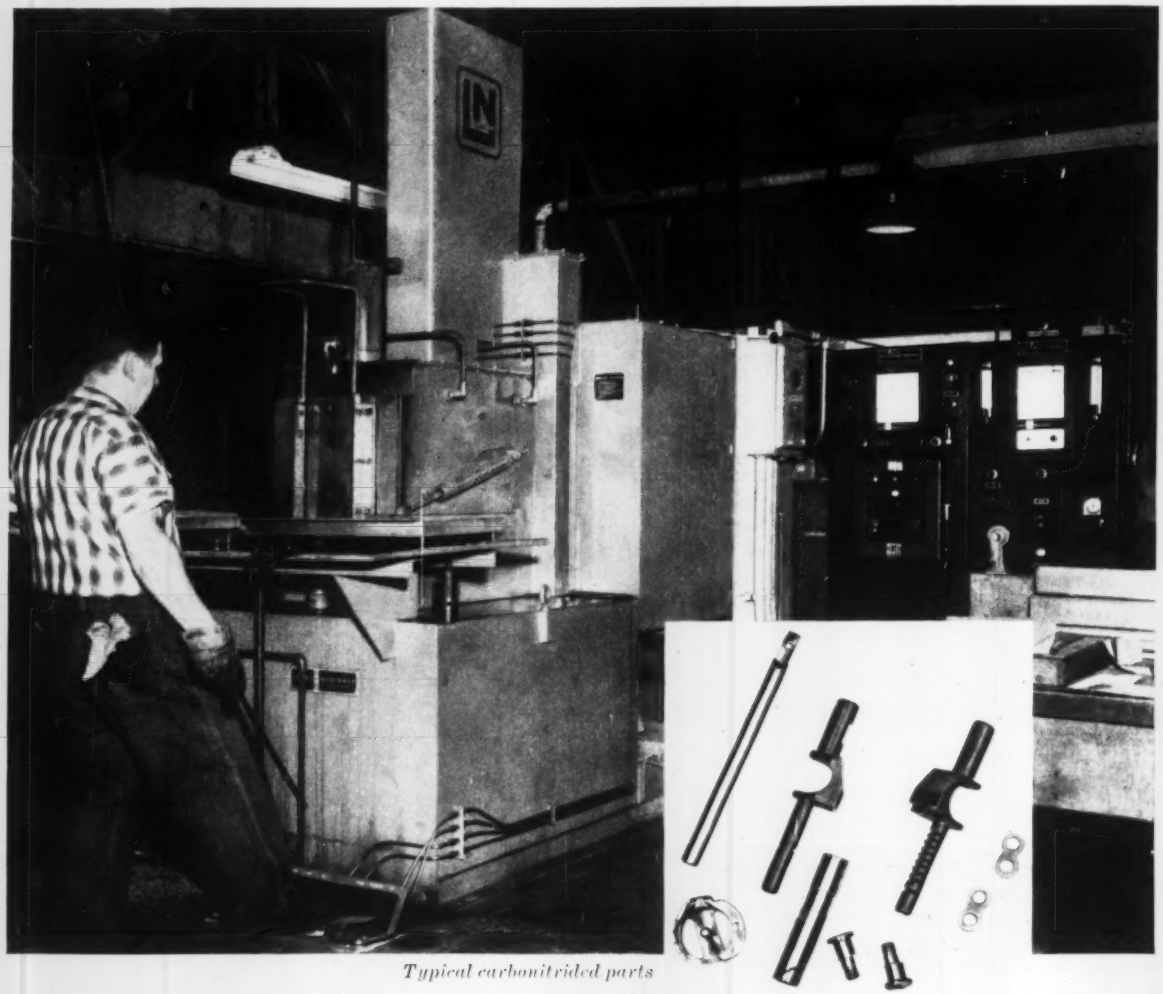
ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



Typical carbonitrided parts

"Here at Singer we're not only saving money on cyanide salt . . .

but on handling costs formerly required to string up each part individually." So says the Heat-treat Manager of the Singer Manufacturing Company's plant at Elizabeth, N.J. where a new L&N Tricarb furnace was recently installed. "As yet," he says, "we can't give any exact cost figures. We've just been running parts and checking them through Quality Control. But we know our cost per part has really dropped."

At the present time, Singer is carbonitriding various sewing machine parts made of SAE 1010 to a case depth of 0.008" to 0.015" at 1550 F for ½ to ¾ of an hour at temperature. The cycles are fast and the work comes out of the protected atmosphere quench clean and bright.

The Manager points out that, "Once these parts are okayed by Quality Control we plan to do case carburizing and homogeneous carburizing in the same furnace. With Microcarb control we can tell exactly what we're doing and where we are. We bought this furnace as part of a quality control and reduced cost program . . . it's the most precise heat-treating tool we could find on the market. It's a natural for handling the variety and caliber of work we have to turn out."

If you, like Singer, must heat-treat a myriad of parts . . . need versatility and precision control . . . it will pay you to investigate this Tricarb furnace. It is a complete heat-treating package with integral quench and direct and continuous temperature and carbon control. In just one furnace you can now do controlled surface carburizing, carbon restoration, hardening, homogeneous carburizing or carbonitriding.

For more information *ask for Folder T 620(17).*
Just write us at 4957 Stenton Avenue, Philadelphia 44, Pa.
or call your nearest L&N office.

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	28.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	31.50	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	29.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	32.75	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	34.00	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	34.50	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	38.25	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	39.75	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	51.25	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	63.75	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	51.25	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	62.25	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	41.50	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	22.25	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	34.75	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	22.50	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company, Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.06	....

	Strip, Carbon Base—Cold Rolled— 10%	Both Sides
Copper*	$36.20	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	W Hot Wk. (H-21)	1.425-1.44
Oil Hardening (O-1)	0.505	V-Cr Hot Work (H-13)	0.550
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. I3 (Phos. 0.035% max)	$73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Troy,N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]	Structural Shapes	Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.12	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.53#	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	11.00	52.33	8.63	9.10	11.25#	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[3]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.25	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25#	15.05	9.00	8.89	10.20
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted: cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Curtner, Calif., $185; Canon City, Colo., $183.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$10.75-11.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian (export tax included) $0.915-$0.965 per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00

Domestic

Rail nearest seller

48% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe: Minimum trucklots, freight allowed east of	
Mississippi River: 100 mesh, 100 lb bags	11.25
100 mesh, 100 lb pails	9.10‡
40 mesh, 100 lb bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum: Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.40-50.90†
Bronze, 5000-lb lots	52.20-56.20†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	52.80-57.20†
Phosphor-Copper, 5000-lb lots	64.60
Copper (atomized) 5000-lb lots	45.10-53.60†
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20†
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom.**
1000 lb	2.80
less 1000 lb	2.95
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	15.50
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.40	$5.40	$5.30	$5.75
Bar Size Angles	5.10	5.10	5.00	5.43
Structural Angles	5.10	5.10	4.90	5.43
I-Beams	5.11	5.11	5.01	5.45
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.37	6.37	6.37	6.69
Sheets, H.R.	8.25	8.25	8.25	8.55
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.76	25.64	25.64	26.51
Barbed Wire (†)	6.55	6.55	6.55	6.90
Merchant Bars	5.35	5.35	5.30	5.85
Hot-Rol'ed Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.19	5.32	5.14	5.49
Wire Rods, O.H. Cold Heading Quality No. 5	5.09	6.22	6.04	6.34
Bright Common Wire Nails (§)	7.85	7.75	7.67	8.20

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.08% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c, less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max), 8M x D, carload bulk 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 29.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb, f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb. of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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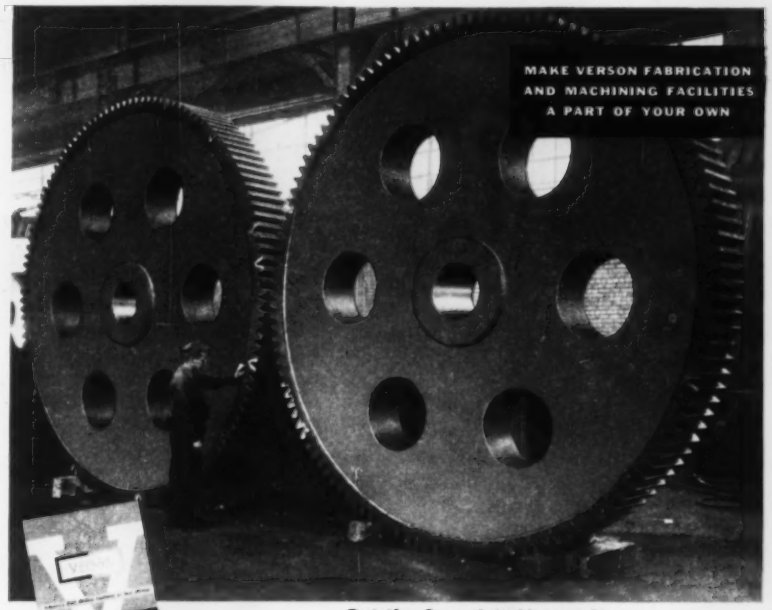

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Price Drop in Scrap Continues

STEEL's composite on No. 1 heavy melting declines another $1.50. At $34.67, it's the lowest since May, 1958. Bottom not yet in sight; buying is slow

Scrap Prices, Page 142

Chicago — Lack of demand and adequate supply added to the woes of the scrap market the last week. Prices are off another $1 to $4 a ton. But the steelmaking rate continues at a record pace.

No. 1 industrial heavy melting steel is off $4, No. 1 dealer heavy melting $3, and No. 1 railroad heavy melting $3. No. 1 factory bundles, borings, and turnings have dipped another $1 a ton.

Philadelphia—Prices continue to decline in a slow market. No. 1 heavy melting is quoted at $33-$34; No. 2 heavy melting, $27-$28; No. 1 bundles, $36-$37; No. 2 bundles, $21-$22; electric furnace bundles, $38-$39; machine shop turnings, $19; heavy turnings, $32-$33; couplers, springs, and wheels, $42-$43; rail crops (1 ft and under), $58-$60; malleable, $67-$68.

New York—Despite high ingot operations, domestic demand for steel scrap is slow. The mills appear to have fairly good stocks, and are not pressing for tonnage. Foreign requirements, though, continue active, and these are helping to sustain brokers' buying prices on the major open hearth grades.

All prices held unchanged last week, including those on cast iron and the stainless grades. In the case of No. 2 bundles and machine shop turnings, the market is purely nominal, with too little trading to provide a test.

Pittsburgh—While railroad scrap prices broke sharply on recent lists, other items are reasonably firm. It's unlikely the market will drop much lower unless dealers become desperate for cash.

"A surprising volume of business is being done at current levels," a local broker comments. He has had no trouble filling mill orders for No. 1 heavy melting at $37, delivered.

Cleveland — Despite high level production, the steel mills continue to show little interest in dealer scrap. They're leaning heavily on home generated material and hot metal. Prices are unchanged, but they're nominal in the absence of a thorough buying test. Monthend bids on auto lists are expected to set the market pace in the weeks ahead.

Youngstown—A small purchase of No. 1 heavy melting scrap by a district steelmaker was made here last week at $40—the same price that applied on a small buy the week preceding. Prices on No. 2 material are nominal.

Detroit — The absence of orders has brought the local scrap movement to a virtual halt. The market undertone is soft. Automotive scrap generation is high and it looks like

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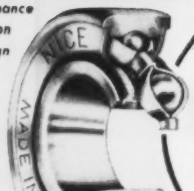

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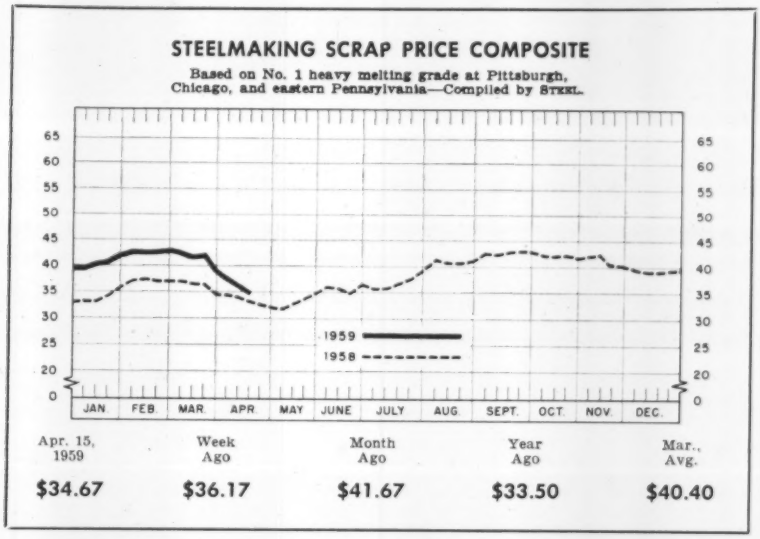


it'll be still higher. This material is moving to the mills first, and brokers say some of it is going into stockpiles.

The feeling is strong that dealer prices won't go much lower, but there's apt to be another drop in auto list prices at the end of this month. However, the market's so touchy even a small order might cause a short upswing in quotations.

Buffalo—The market continues to lean toward the downside, with mill buying lacking. Prices haven't dropped, but dealers anticipate a lower market next month. The price decline in recent weeks has slowed down collections.

Cincinnati—The market is weak in the absence of mill buying. Since the opening of this month, key grades have slipped $2 to $4 a ton despite rising steelmaking operations in the district—now reported at 90 per cent. Brokers think the next price movement will be upward.

St. Louis—Prices are still slipping. There were two breaks in the market last week within 24 hours. The first scaled down prices $2 a ton, and the second another $1. Supplies are increasing, and mills are not taking half the tonnage offered them.

Birmingham — Weakness in the local market was emphasized last week when an Atlanta mill bought material at $4 under its last purchase.

Houston—April mill orders are about covered, and export activity is at a standstill. Mexican buyers continue to stay out of the market. A seasonal slowing down in the flow of country scrap is noted with farming operations getting into high gear.

San Francisco — There is little steel scrap moving to the mills, but prices are firm following the recent drop of $1 a ton on No. 2 heavy melting steel.

Seattle—The market situation is unchanged, with mills showing no disposition to increase their inventories, but export activity providing a prop for prices. Some cargoes are being assembled for early movement to Japan.

Los Angeles—Despite high steel production, the scrap market is weak. The mills are not buying. Collections are off because of the weak prices. Machine shop turnings were quoted off $2 last week.

Hamilton, Ont. — Brokers have reduced prices $2.50 a ton on most grades. Canadian mills are showing limited interest in offerings.

Ferroalloys . . .

Ferroalloy Prices, Page 138

Domestic production of silicon alloys and metal (silvery pig iron, ferrosilicon, silicon briquets, silicon metal, miscellaneous silicon alloys) in 1958 came to 527,399 net tons, reports the U. S. Bureau of Mines. The figure is about 33 per cent under 1957 output.

Shipments amounted to 506,584 net tons, off 34 per cent from the preceding year. Apparent consumption was 515,990 tons (shipments, plus imports, minus exports), about 34 per cent below the figure for the previous year. Imports last year amounted to 11,582 tons and exports 2176 tons.

Stocks held by producers at the end of December amounted to 139,346 net tons. In addition to shipments of 506,584 tons, 32,250 tons were used in producing other silicon alloys.

Pig Iron . . .

Pig Iron Prices, Page 136

Movement of pig iron is increasing gradually, as predicted earlier. Consensus is that gains will be registered this month, with shipments rising to a new high for the year.

Demand is still far from brisk, however, with consumers buying largely hand to mouth. Most of them show little interest in accumulating reserves, although they may as the threat of a steel strike draws closer.

Lake freighters are being loaded with pig iron at Buffalo and will be making the trip west as soon as ice conditions permit. The *James W. Watt* has completed loading 5500 tons of iron at the Hanna Furnace plant and is awaiting sailing notice. A sister ship, the *J. P. Wells*, is also loading a similar cargo. The movement of merchant iron to the midwestern market by lake vessel is scheduled to be heavy in the next couple of months as users seek to bolster stocks.

British Columbia Ore Is Finding Market in Japan

The most recent negotiations by Japanese importers indicate the movement of British Columbia iron ore to Japan is nearing the proportions of a $30 million to $40 million business.

Nimpkish Iron Mines Ltd. (owned by Standard International Mines, Canadian subsidiary of Standard Slag Co., Youngstown, and International Iron Mines, a Canadian company) will be shipping iron ore in July and August from the Nimpkish Lake region of northern Vancouver Island. The company has proven about 1 million tons of ore and expects to prove

(*Please turn to Page* 148)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, April 15, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 15	$34.67
Apr. 8	36.17
Mar. Avg.	40.40
Apr. 1958	33.08
Apr. 1954	25.67

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 dealer bundles	39.00-40.00
No. 2 bundles	26.00-27.00
No. 1 busheling	*36.00-37.00*
No. 1 factory bundles	45.00-46.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals:	
2 ft and under	46.00-47.00
3 ft lengths	45.00-46.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	47.00-48.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	46.00-47.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Random rails	*52.00-53.00*
Railroad specialties	*47.00-48.00*
Angles, splice bars	*51.00-52.00*
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*35.00-36.00*
No. 1 hvy melt., dealer	*32.00-33.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 factory bundles	*39.00-40.00*
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling, indus.	*35.00-36.00*
No. 1 busheling, dealer	*32.00-33.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*19.00-20.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals, 3 ft	*41.00-42.00*
Punchings & plate scrap	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	42.00-43.00
Unstripped motor blocks	36.00-37.00
Clean auto cast	53.00-54.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
R.R. malleable	*56.00-57.00*
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Angles, splice bars	*48.00-49.00*
Axles	*66.00-67.00*
Rails, rerolling	*57.00-58.00*

Stainless Steel Scrap

18-8 bundles & solids	215.00-225.00
18-8 turnings	120.00-125.00
430 bundles & solids	120.00-125.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	38.00-39.00
No. 1 busheling	*39.00-40.00*
No. 1 bundles	40.00-41.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	*40.00-41.00*
Electric furnace bundles	*40.00-41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*

CLEVELAND

No. 1 heavy melting	*35.50-36.50*
No. 2 heavy melting	24.00-25.00
No. 1 factory bundles	40.00-41.00
No. 1 bundles	*35.50-36.50*
No. 2 bundles	24.00-25.00
No. 1 busheling	*35.50-36.50*
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	37.00-38.00
Cut structurals, plates 2 ft and under	44.00-45.00
Low phos, punchings & plate	*36.50-37.50*
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	*36.50-37.50*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	33.00-34.00
Brake shoes	36.00-37.00
Clean auto cast	*50.00-51.00*
Burnt cast	37.00-38.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	46.00-47.00
Railroad specialties	48.00-49.00
Uncut tires	42.00-43.00
Angles, splice bars	*51.00-52.00*
Rails, rerolling	58.00-59.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-125.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00
No. 2 heavy melting	33.00
No. 1 bundles	*37.00*
No. 2 bundles	*23.00*
No. 1 busheling	37.00
Machine shop turnings	*16.00*
Short shovel turnings	*18.00*

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	*42.00*
Heavy breakable cast	*40.00*
Unstripped motor blocks	41.00
Clean auto cast	50.00
Stove plate	45.50

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00*
Rails, 18 in. and under	52.00
Rails, random lengths	46.50
Rails, rerolling	*57.00*
Angles, splice bars	*44.00*

BIRMINGHAM

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	21.00-22.00
No. 1 busheling	*30.00-31.00*
Cast iron borings	14.00-15.00
Machine shop turnings	23.00-24.00
Short shovel turnings	24.00-25.00
Bars, crops and plates	40.00-41.00
Structurals & plates	39.00-40.00
Electric furnace bundles	36.00-37.00
Electric furnace:	
2 ft and under	34.00-35.00
3 ft and under	33.00-34.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	52.00-53.00
Rails, random lengths	41.00-42.00
Angles, splice bars	*43.00-44.00*

PHILADELPHIA

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	35.00-36.00
Electric furnace bundles	*38.00-39.00*
Mixed borings, turnings	20.00†
Short shovel turnings	23.00-24.00
Machine shop turnings	*19.00†*
Heavy turnings	*32.00-33.00*
Structurals & plate	41.00-43.00
Couplers, springs, wheels	42.00-43.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	43.00
Drop broken machinery	49.00-50.00
Malleable	*67.00-68.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	17.00-18.00†
Machine shop turnings	10.00-11.00†
Mixed borings, turnings	13.00-14.00
Short shovel turnings	14.00-15.00
Low phos. (structurals & plates)	35.00-36.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	24.00-25.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Mixed borings, turnings	19.00-20.00
Machine shop turnings	17.00-18.00
Short shovel turnings	21.00-22.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	27.50-28.50
No. 1 bundles	34.00-35.00
No. 2 bundles	21.00-22.00
No. 1 busheling	34.00-35.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	18.00-19.00
Cast iron borings	17.00-18.00
Low phos., 18 in.	43.00-44.00

Cast Iron Grades

No. 1 cupola	43.00-45.00
Heavy breakable cast	39.00-40.00
Charging box cast	38.00-39.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	47.00-48.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	36.00
No. 2 bundles	*22.00†*
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	43.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	26.00-27.00
No. 1 busheling	26.00-27.00
Machine shop turnings	*8.00-9.00*
Short shovel turnings	*12.00-13.00*
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	30.00-31.00
No. 2 bundles	17.00-18.00
No. 1 busheling	27.00-28.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	15.00-16.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	30.00-31.00
Charging box cast	32.00-33.00
Heavy breakable	32.00-33.00
Unstripped motor blocks	19.00-20.00
Clean auto cast	43.00-44.00

SEATTLE

No. 1 heavy melting	35.00
No. 2 heavy melting	33.00
No. 1 bundles	29.00†
No. 2 bundles	23.00†
Machine shop turnings	17.00
Mixed borings, turnings	17.00
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	35.00
No. 2 bundles	18.00
Machine shop turnings	*15.00*
Shoveling turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	49.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	34.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

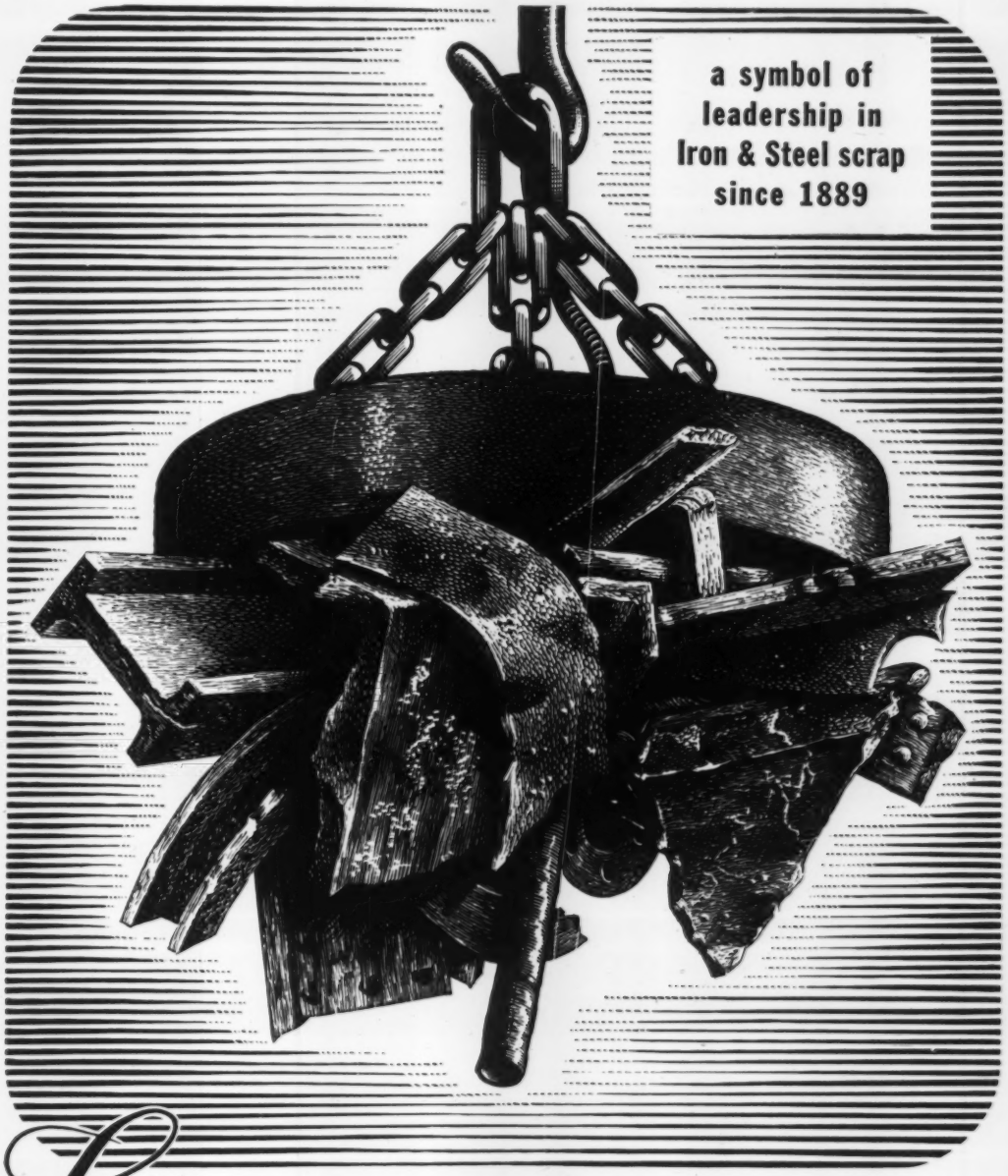
(Brokers' buying prices)

No. 1 heavy melting	*32.25*
No. 2 heavy melting	*28.25*
No. 1 bundles	*32.25*
No. 2 bundles	*22.75*
Mixed steel scrap	*24.25*
Mixed borings, turnings	*13.00*
Busheling, new factory:	
Prepared	*32.25*
Unprepared	*26.25*
Short steel turnings	*17.00*

Cast Iron Grades‡

No. 1 machinery cast	*46.50-48.00*

†Nominal.
‡F.o.b. Hamilton, Ont.



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Market Still Jittery

Strike threats and sporadic buying keep it that way. Don't look for much price action over the next month or two. Hedge buying is slower than it was

Nonferrous Metal Prices, Pages 146 & 147

NONFERROUS people continue to be uncertain about the next few months.

All metals would be affected by a steel strike. Producers are also fearful of labor difficulties within their own industries—copper, aluminum, lead, and zinc could all see summer walkouts. Strikes in the U. S., plus wildcat walkouts and threats of trouble in South America and Africa keep both buyers and sellers tense.

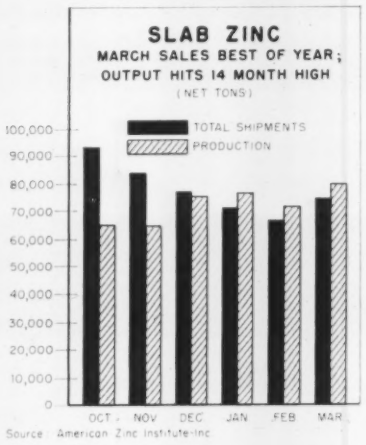
Even so, there's less hysteria in the market. Users are evidently learning how to live with the uncertainties. One symptom: A decline in hedge buying.

• **Copper**—Nowhere is this better illustrated than in copper. Custom smelters, who had been quoting 34 cents a pound, dropped their price 1 cent a pound on both Apr. 10 and 13. The present price is 32 cents. A variety of reasons are behind the dips. One is that customers evidently decided the price wasn't right. At the same time, speculators on the U. S. Commodity Exchange and London Metal Exchange pulled in their horns as the feeling grew that world production is exceeding consumption. Then scrap dealers lowered their prices in sympathy to the easing in speculative activity. Custom smelters had no choice but to follow.

The market is still volatile enough for anything to happen. Here's the way observers size it up: Look for uncertainty to dominate the market between now and June 30. Demand for primary copper will continue strong—no one is sure how much will be purchased as a hedge against a strike. World stocks will probably go up.

The 31.5 cent primary price looks stable over the next ten weeks. The custom smelter quotation could fluctuate in either direction. Consensus is it won't move much before labor negotiations commence.

• **Aluminum**—Although sales are running along nicely, metalmen don't believe much of the buying is a hedge against a strike. Users aren't too fidgety. They know producers' stocks are high and that output is running considerably under capacity. (STEEL estimates operations at around 82 per cent in the U. S., 65 per cent in Canada.)



Source: American Zinc Institute, Inc.

How about a strike? One industry labor relations man privately voices this view: Labor will win a one year contract containing a 10 cent an hour wage package. There will be no strike, but the industry will bump pig prices 2 cents a pound after Aug. 1 to help cover costs.

• **Zinc**—Users have been buying in spurts over the last few months, so that demand has been strong for a week or two, then fair to weak for a while, then the cycle starts over. The market treads such a fine line any sudden buying spree would probably result in a price hike. Such a move doesn't seem likely soon—buyers evidently prefer to live on minimum inventory and feel no need to build up stocks.

March statistics show slab zinc shipments hit 74,296 tons, to register the best mark since December. Counterbalancing this gain was a rise in smelter production to 79,918 tons, with a resultant rise in stocks to 206,083 tons. But one metalman makes the point that over-all stocks above ground (including concentrates) are on the decrease.

• **Lead**—The lead market has been a prima donna of late. Prices have fluctuated up and down at the slightest change in market tempo. This in turn causes further sporadic buying as users try to outguess price movements.

Latest statistics don't paint an optimistic picture. February world deliveries of lead dropped to 100,009 tons from the 124,052 tons shipped the preceding month. Stocks rose to 368,279 tons.

Recently, the supply of custom lead has tightened. This could signify that the market is on its way up again.

NONFERROUS PRICE RECORD

	Price Apr. 15	Last Change	Previous Price	Mar. Avg	Feb. Avg	Apr., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.000
Nickel	74.00	Mar. 16, 1959	31.50–32.00	32.031	30.159	24.323
Copper	31.50–32.00	Apr. 13, 1959	31.50–33.00	32.031	30.159	24.323
Lead	10.80	Aug. 13, 1956	33.75	35.250	35.250	35.250
Magnesium	35.25	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.50	Apr. 15, 1959	102.25	103.000	102.364	93.021
Zinc	11.00	Feb. 25, 1959	11.50	11.000	11.409	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig 99.8%, Velasco, Tex.

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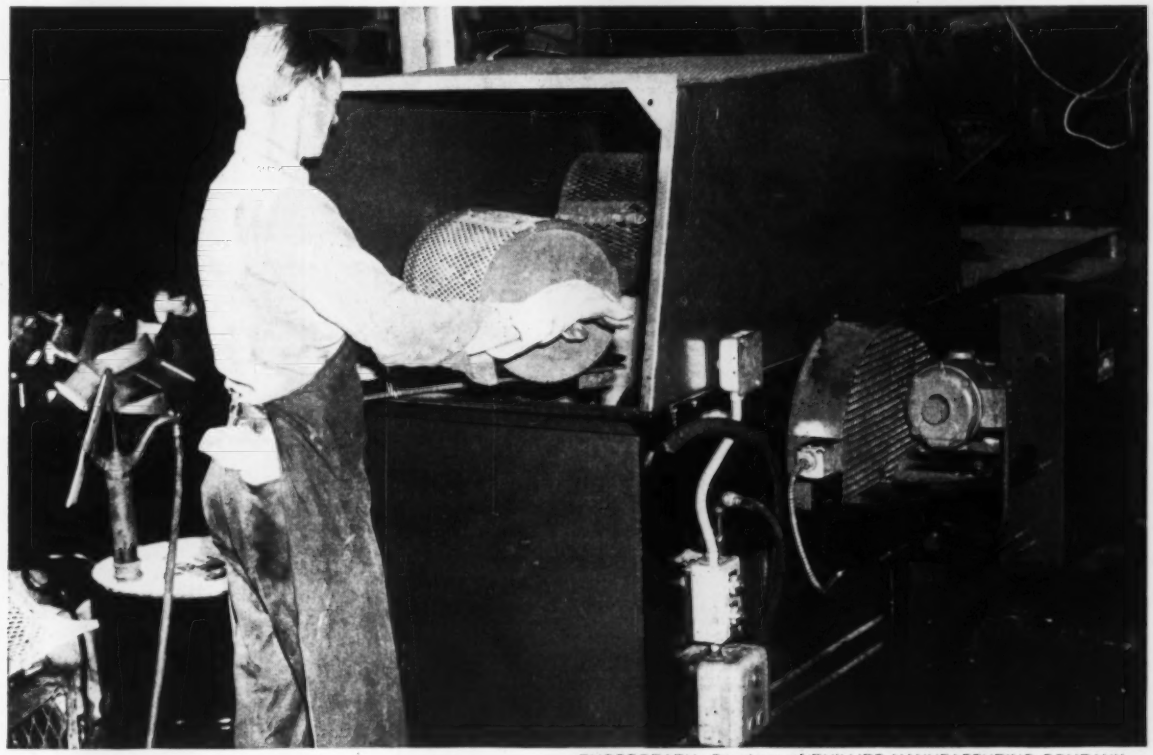

PHOTOGRAPH: Courtesy of PHILLIPS MANUFACTURING COMPANY

The new Phillips Rotomatic with liquid dip permits strict control of cleaning cycles. In addition the back end of the tank, above the boiling sump, can be used as a straight batch-type degreaser.

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Nonferrous Metals

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PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb. f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.30 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 31.50 deld.; custom smelters, 32.00; lake, 31.50 deld.; fire refined, 31.25 deld.

Germanium: First reduction, less than 1 kg, 41.00 per gram; 1-10 kg, 37.00 per gram; intrinsic grade, 35.00-37.00 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 nom. per troy oz.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90, St. Louis. New York basis, add 0.20.

Lithium: Cups or ingots, 50-100 lb, $10 per lb, f.o.b. Minneapolis; 100-500 lb, $9.50 per lb deld.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $239-240 per 76 lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.50.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 13.50; No. 2, 14.00; No. 5, 13.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy, 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 31.25; tin bronze, No. 225, 42.25; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.855; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.50-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50 20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64 20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-75	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-.30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 24.50-25.00; No. 2 heavy copper and wire, 22.50-23.00; light copper, 20.50-21.00; No. 1 composition red brass, 19.00-19.50; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	55.63b	52.86c	....	55.82
Yellow Brass	48.24	32.73d	48.78	51.65
Low Brass, 80%	51.23	51.17	51.77	54.54
Red Brass, 85%	52.29	52.23	52.83	55.60
Com. Bronze, 90%	53.90	53.84	54.44	56.96
Manganese Bronze	56.54	50.14	60.62	....
Muntz Metal	50.85	46.16	....	....
Naval Brass	52.80	46.61	59.36	56.21
Silicon Bronze	60.67	59.86	60.21	78.35
Nickel Silver, 10%	63.82	66.15	66.15	....
Phos. Bronze	75.34	75.84	75.84	77.02

SCRAP ALLOWANCES e (Based on copper at 31.50c)

	Clean Heavy	Rod Ends	Clean Turnings
	27.500	27.500	26.750
	20.625	19.750	18.750
	23.250	23.000	22.500
	24.250	24.000	23.500
	25.125	24.875	24.375
	19.125	18.875	18.375
	19.375	19.125	18.625
	19.125	18.875	18.375
	27.000	26.750	26.000
	25.500	25.250	12.625
	28.625	28.375	25.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 18.00-18.50; new brass clippings, 17.50-18.00; light brass, 13.00-13.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 15.00-15.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.50-16.00.

Lead: Soft scrap lead, 7.00-7.50; battery plates, 2.00-2.25; linotype and stereotype, 8.25-8.75; electrotype, 6.75-7.25; mixed babbitt, 8.75-9.25.

Monel: Clippings, 26.00-28.00; old sheets, 23.00-25.00; turnings, 20.00-21.00; rods, 26.00-28.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 38.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.25; old diecast scrap, 1.50-1.75.

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 6.50-7.00; segregated low copper clips, 13.25-13.75; segregated high copper clips, 13.25-13.75; mixed low copper clips, 12.25-12.75; mixed high copper clips, 11.25-11.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.75-12.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.75-17.25; segregated high copper clips, 15.75-16.25; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.25-15.75.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 13.50-14.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 26.00; light copper, 23.75; refinery brass (60% copper) per dry copper content, 25.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 26.00; light copper, 23.75; No. 1 composition borings, 21.00; No. 1 composition solids, 21.50; heavy yellow brass solids, 15.50; yellow brass turnings, 14.50; radiators, 16.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.30.

Copper: Flat-rolled, 47.79; oval, 46.00 5000-10,000 lb; electrodeposited, 40.50, 2000-5000 lb lots; cast, 43.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.30; 2000-5900 lb, 13.30; 6000-11,900 lb, 13.05; 12,000-22,900 lb, 12.80; 23,000 lb or more, 12.30.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

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Desire graduate M. E. expert and experienced in tool design and manufacturing operations. Must enjoy flexible, creative work constantly facing him with the creative demands of new development and applications in material handling, tool design, and equipment utilizations. General supervisory and production experience desirable. Should be interested in keeping abreast of developments in modern metallurgy and advanced metal forming (stamping and fabrication) practices. Excellent opportunity for young man (28-35) now in $7,000-$9,000 range to grow rapidly through his basic contribution to a steadily expanding (non-auto) company in St. Louis. All replies kept strictly confidential. Please address resumes to: D. M. More, 9827 Clayton Road, St. Louis 17, Missouri.

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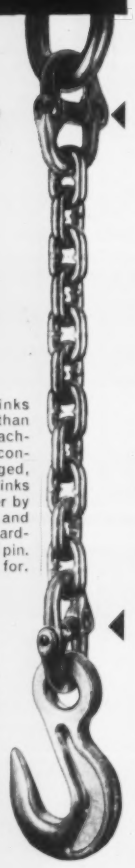

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Taylor Made CHAIN SINCE 1873

(*Concluded from Page 141.*)

considerably more through exploration.

Nimpkish's contract is the third firm one for export of British Columbia ore to Japan. A fourth is shaping up.

Stainless Steel . . .

Stainless Steel Prices, Page 135

Seymour Mfg. Co., Seymour, Conn., is offering deliveries of cold-rolled stainless strip in four to five weeks. It is rerolling grades 301, 302, 304, 305, 316, 321, and 430.

Sheet deliveries average eight weeks and bars eight to ten weeks, depending on availability of hot rolled. The bulk of tonnage is moved through distributors, and buying is reported heavier. Direct government contracts are heavier.

In event of a steel strike, a substantial volume of stainless production will not be affected immediately.

Structural Shapes . . .

Structural Shape Prices, Page 129

Price cutting on fabricated structural steel is not as severe as it was earlier this year, but competition is still sharp despite a seasonal improvement in the volume of work.

Road building is increasing, but it is falling short of expectations. Also, a good demand for office structures and institutional buildings is developing. Industrial work is a little ahead of last year, but is still on the light side.

Structural fabricators are not pressing forward tonnage on the mills. They are placing slightly more orders for contracts in hand. In New England, 4000 tons have been placed for a Naval radio project at Cutler, Maine.

Most bridges up for estimates in New England involve small tonnages, and are composite beam and stringer spans. Relatively little plate girder and wide flange beam work is being estimated. The volume of shopwork is under average.

An Italian company, bidding so low that American producers couldn't even come close, has booked an order from the New York State Power Authority for 900 tons of structural steel. The Societa Anonima Electrificazione, Milan, Italy, bid $284,700 for the Niagara project order.

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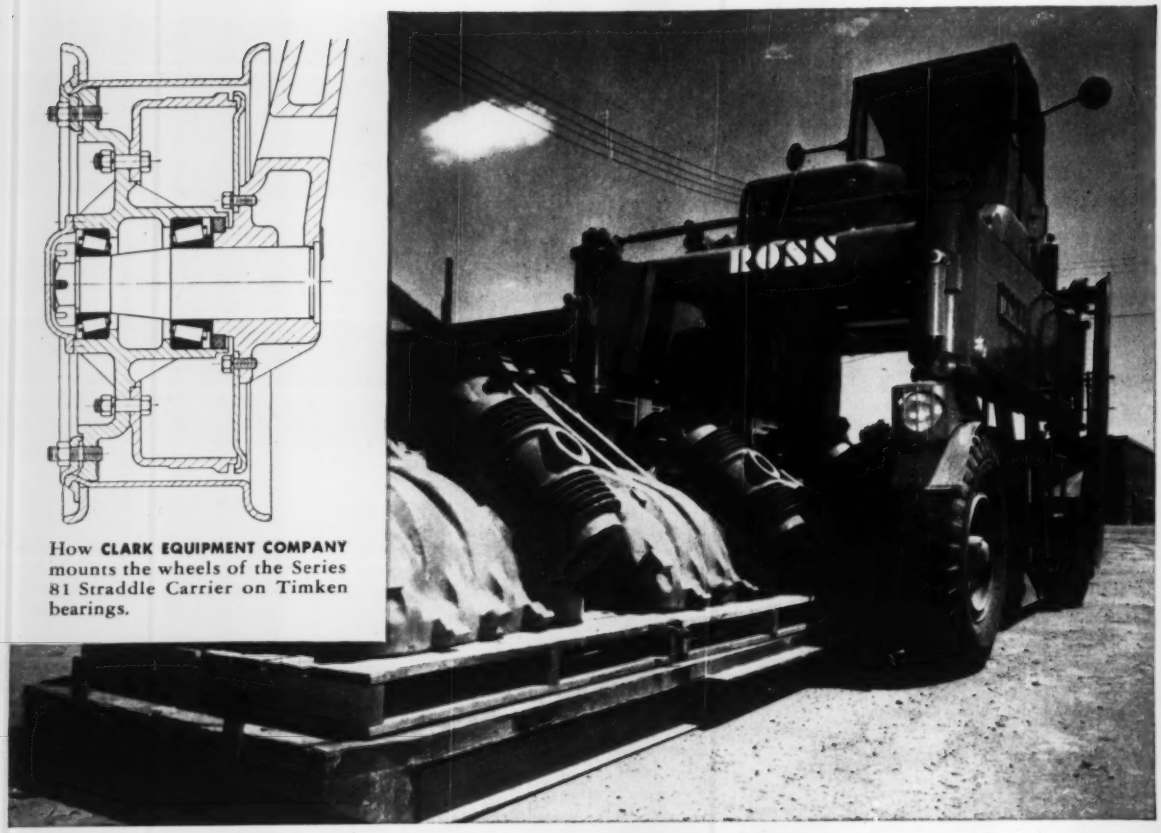

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